Aquatic Habitat Inventory
Of Streams
On National Resource Land,

Salt Lake District
Rich County, Utah

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— Utah State Office

Resources Development Internship Program
Western Interstate Commission for Higher Education

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AQUATIC HABITAT INVENTORY OF STREAMS ON NATIONAL RESOURCE LAND, SALT LAKE DISTRICT Rich County, Utah

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Prepared For:
U.S. Bureau of Land Management
Utah State Office
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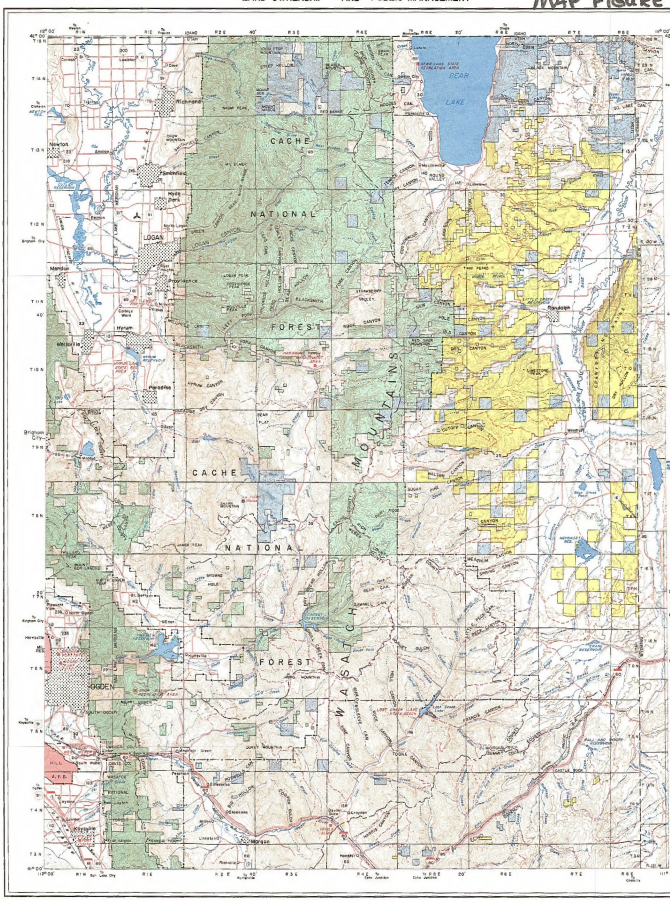
* Appendix materials contain 181 pages of basic raw data on field survey forms which is not included within the body of this summary report. This field data is on file with the BLM Salt Lake District Office, SaltLake City, Utah.

STATE OF UTAH

LAND OWNERSHIP AND PUBLIC MANAGEMENT

MAP FIGURE 1.



LEGEND

- NATIONAL RESOURCE LAND
- PRIVATE LAND
- MILITARY RES. & WDLS.
- STATE LAND
- NATIONAL FOREST

JANUARY 1974

A	B	C		
D	E	F	G	H
I	J	K	L	M
N	O	P	Q	R
S	T	U	V	W

BEAR LAKE-C

The base grid was compiled by the Bureau of Land Management from the official records of cadastral surveys. Map information was taken from maps prepared by the Army Map Service (AMS), Corps of Engineers, U.S. Army, Washington, D.C., and quadrangles published by the U.S. Geological Survey.

The land status was compiled for printing by the Bureau of Land Management from the official federal records with additional data furnished by the Utah State Land Board, and U.S. Forest Service maps.

Contour interval 200 feet with supplementary contours at 100 foot intervals.

INTRODUCTION

Purpose: The purpose of this study was to inventory physical habitat characteristics on all perennial waters on national resource lands (NRL) in Rich County, Utah within the Randolph Planning Unit administered by the U.S. Bureau of Land Management (BLM). This inventory data base will aid the development of BLM land and water management plans for the area and will be particularly useful for administrators and specialists in planning and decision making in aquatic habitat management programs. This information will also be useful to the Utah Division of Wildlife Resources in their fisheries management programs within their Northern Region.

Sponsorship: The project was sponsored by the BLM as part of the Western Interstate Commission for Higher Education (WICHE). The internship position was under the direct supervision of the BLM Salt Lake District Manager, Gerald Hillier. Field supervision was given by Don Duff, fisheries biologist, BLM Utah State Office, and Ed Gomer, wildlife biologist, BLM Salt Lake District.

Scope of the Project: The waters studied on NRL in Rich County were located along a thirty-five mile reach bordering the western drainage of the Bear River in northeastern Utah. Map Figure 1 shows the location of the project study area.

The inventory study was undertaken due to the need by BLM to identify aquatic habitat and water quality characteristics on all waters on NRL for inclusion into BLM's planning system, particularly the Unit Resource Analysis (URA) the Bureau's basic planning document. Most waters within the area contain aquatic habitat with the potential for a wildtrout or catchable type fisheries, but most have been degraded through livestock grazing uses. Current

mineral exploration and oil and gas activities also threaten further habitat degradation and therefore support the need to obtain this basic aquatic inventory data.

The perennial streams originate chiefly from springs (elevation 6500-7200ft.) in the gently sloping foothills and flow eastwards towards the Bear River (elevation, 6600-6200 ft). Most of the streams, however, are diverted into irrigation ditches for agricultural purposes before they can reach the river itself. The vegetation of the foothills is predominantly sagebrush with aspen and conifer found in the higher elevations. The headwater springs of most of the streams are within the sagebrush vegetative zone. The total stream mileage of all streams surveyed was eighty-five miles.

The methods utilized in conducting the aquatic habitat surveys were those used by the BLM in Utah for intensive inventory of waters on national resource lands, as specified within the BLM Utah State Office Manual supplement 6671 - Stream Surveys. Chemical quality sampling was conducted using the HACH field analysis kit supplemented by some analysis by the U.S. Geological Survey District Water Quality Laboratory in Salt Lake City. Analysis for bacteriological components, total coliform and fecal coliform, was done by the Utah State Division of Health Laboratory in Salt Lake City.

RANDOLPH CREEK

June, 1975

Randolph Creek is a moderate-sized, fair quality fisheries at present. It flows for three and three-quarters miles, beginning in Forest Service land and joins Big Creek. All but one quarter mile of the stream is on BLM or USFS land.

The creek is primarily used for livestock and secondarily as a fishing stream. With proper management and improvements, this creek could be a good quality fisheries.

STREAM HABITAT SURVEY SUMMARY AND ANALYSIS

1. State -- County: Utah -- Rich
2. District: Salt Lake
3. Resource Area -- P.U.: Randolph
4. Drainage: Big Creek
5. Stream Unit: Randolph Creek
6. Location: T. 10 N R. 5E,6E Sect.
7. Investigators: G. Ryan - Duff - Gebhardt
8. Date: 6/26/75 - 7/1/75

General Data

9. Total length of stream (mi.) 3.75

10. Total length of stream:

	Surveyed (mi.)	Percent Ownership
a. BLM	3.0	80
b. USFS	0.5	13
c. Public, other		
d. Private	0.25	7

11. Total No. sample stations:
a. BLM 4
b. Public 1
c. Private 1

12. Total of all stream width measurements (ft.) 334

13. Total channel width (ft.) 451

14. Total width - all pools (ft.) 68

15. Total width of all pools classed 1, 2, and 3 (ft.) 5

16. Total footage of desirable bottom materials (ft.) 246

17. Total spawning gravels (ft.) 218

18. Sum of cover ratings 87

19. Sum of stability ratings 142

20. Elevation: (M.S.L.)
a. Lowest 6530
b. Highest 7120

21. Multiple use zones cattle
people

22. Number of camera points 19

23. Total cost
a. Planning
b. Salaries
c. Equipment
d. Analysis of data

Priority "A" Limiting Factors

24. Cost per station
25. Percent of total stream width in pools 20
26. Pool-riffle ratio, % optimum 40
27. Pool quality, & optimum 1
28. Percent of stream bottom with desirable materials 74
29. Bank cover, % optimum 42
30. Bank stability, % optimum 65
31. Percent of habitat optimum 44

Priority "B" Limiting Factors

32. Average depth of stream (ft.) 0.5
33. Average width of stream (ft.) 10
Percent stream shaded 14
34. Percent of bottom with clinging vegetation (ft.) 41
Percent sedimentation 17
35. Percent of bottom with rooted vegetation (ft.) 3
36. Average stream gradient (%) 2.1
Percent landform gradient RB 17.8
LB
37. Average stream velocity (f/s) 3.6
38. Stream discharge (c.f.s.) 10.6
39. Average water temperature: (°F or °C) Max. 46
Min. 57.2
40. Turbidity description 77 clear-milky
41. Access: (mi.)
a. Remote
b. Low standard trails
c. Improved trails
d. Low standard roads 3.5
e. Improved roads
42. Water quality analysis:
a. Hatch kit X
b. Chemical X
c. Coli X

(over)

43. General Remarks

There is an extensive section of both deserted and active beaver dams from S-4 to above S-5, creating shallow pools and grassy meadows.

Two stations were placed adjacent to each other, one on BLM land (S-4) and one on private land (S-4b), in order to observe possible differences in stream conditions. The banks on the private land and BLM land ½ mile above S-4 are badly fracturing and eroding (nearly 100% unstable). Banks downstream and upstream of this section (on BLM land) are considerably more stable. There is greater sedimentation and less spawning gravels on S-4b than on S-4.

Chemical analyses and bacteriological counts are adequate for a fisheries.

At S-1, caddisfly larvae are numerous, mayflies slight and no stoneflies were observed. Sighted an immature golden eagle at S-1 and two Swainson's hawks a S-2.

44. Narrative Report - Watershed Condition

The lower two-thirds of the creek are located in moderately sloping foothills of sagebrush community. The upper third of the creek is in a deep, steep-sided canyon with conifer-aspen communities on the Forest Service land.

Randolph Creek is included along with Big Creek in the Big Creek Allotments with a total of 4046 AUMs. The general watershed condition appears to be deteriorating due to overuse. See the Appendix for further details. Cattle overuse is clearly evident in fractured, eroding banks and dead willows along the whole stream. Conditions are better upstream on USFS land than on BLM or private land.

Cattle were observed along the streambed from mid-June through August. Up to 150 head of cattle were seen along the streambed at any one time.

The USFS bank stability evaluation form rates the bank stability as "fair."

45. Management Recommendations

Randolph Creek could be made into a good fisheries if these three major problems are solved: 1) Cattle access to the stream must be limited in order to improve bank stability and cover and to reduce sedimentation. This can be done by: a) fencing out the cattle from the stream allowing access at intervals. b) Use a rest-rotation management system. c) It appears that allotment reduction did not reduce the deterioration trend when tried in the early 60's. It is questionable whether this method is useful now. 2) Improve the pool: riffle ratio by building log structures and/or building gabions or trashcatchers. 3) Stabilize eroding banks and increase stream cover by planting willows and other native plants on the banks and restricting cattle. At some badly fractured bank areas, rocks could be placed along the banks or partial structures built to rechannel the current.

A more intensive survey is needed before improvement plans can be made.

TABLE I. SUMMARY OF PHYSICAL STREAM HABITAT CHARACTERISTICS

Randolph Creek

Station	% Optimum Habitat						% Water Surface in Channel Area	% Spawning 1/ Gravels	2/ % Silt Sediments	Avg. Depth (Ft.)	Avg. Width (Ft.)	Channel Width (Ft.)	Velocity (fps)	Stream flow (c.f.s.)	% Stream Gradient	Temp. (°F)		Land-for gradient %		Stream Shade %
	Pool-Riffle Ratio	Pool Quality	Stream Bottom	Bank Cover	Bank Stability	Total Habitat										Air	Water	LB	RB	
BLM 1	22	0	100	30	75	45	83	82	9	0.5	9	11	4.8	12.4	2	4.6	4.4	4.7	17.1	5
2	26	0	92	28	58	41	79	77	20	0.3	10	12	3.1	12	1	48	41	10.0	8.2	0
3	30	0	73	33	50	37	72	61	10	0.6	8	11	4.5	13	2	46	41	25.4	36.3	0
4	40	0	93	50	73	51	84	71	5	0.4	12	14	3	-	2	52	46	24.8	26.8	40
6/19/75																				
AVG	30	0	90	35	64	44	79	73	11	0.5	10	12	3.9	12.5	1.8	48	43	16.2	22.1	11
USFS 1	58	7	94	50	75	57	55	71	10	0.5	11	21	4	10.6	2.2	52	46	21	40	10
6/26/75																				
AVG																				
Private 4b	28	0	100	58	60	49	87	43	43	0.6	12	14	2.3	-	3.3	79	57	21	28	30
7/1/75																				
AVG																				

1/ Includes only fine and coarse gravels (0.1 to 3.0 inches).

2/ Includes sand, muck, and silts averages for each individual station.

WOODRUFF CREEK

August, 1975

Woodruff Creek is large and long. It flows seventeen and three-quarters miles. Most of the stream is on private land (ten miles) and State lands (six miles). Only one-quarter mile of the creek is on BLM land. This section is just beneath Woodruff Reservoir, a deep and long (one and a half miles) body of water which provides good fishing. Good stream fishing is found on the creek on the BLM land and for a half mile further downstream on private and State land. Below this, the stream is usually inaccessible because of dense willow growth.

STREAM HABITAT SURVEY SUMMARY AND ANALYSIS

1. State -- County: UT Rich
2. District: Salt Lake
3. Resource Area -- P.U.: Randolph
4. Drainage: Bear River
5. Stream Unit: Woodruff Creek
6. Location: T. 9 N. R. 6 E. Sect.
7. Investigators: Ryan (WICHE) - Gomer
8. Date: August 8 through 14, 1975

General Data

9. Total length of stream (mi.): 17.75

10. Total length of stream:

	Surveyed (mi.)	Percent Ownership
a. BLM	.25	1.41
b. USFS		
c. Public, other		
d. Private		
State	1.25	7

11. Total No. sample stations:
a. BLM: 1
b. Public: 1
c. Private:

12. Total of all stream width measurements (ft.): 236

13. Total channel width (ft.): 3x6

14. Total width - all pools (ft.): 87

15. Total width of all pools classed 1, 2, and 3 (ft.): 80

16. Total footage of desirable bottom materials (ft.): 225

17. Total spawning gravels (ft.): 62

18. Sum of cover ratings: 32

19. Sum of stability ratings: 56

20. Elevation: (M.S.L.)
a. Lowest: 6360
b. Highest: 8000

21. Multiple use zones: Fishing, Cattle

22. Number of camera points: 4

23. Total cost
a. Planning
b. Salaries
c. Equipment
d. Analysis of data

Priority "A" Limiting Factors

24. Cost per station
25. Percent of total stream width in pools: 37
26. Pool-riffle ratio, % optimum: 74
27. Pool quality, & optimum: 92
28. Percent of stream bottom with desirable materials: 94
29. Bank cover, % optimum: 46
30. Bank stability, % optimum: 76
31. Percent of habitat optimum: 74

Priority "B" Limiting Factors

32. Average depth of stream (ft.): 0.7
33. Average width of stream (ft.): 24
Percent stream shaded: 25
34. Percent of bottom with clinging vegetation (ft.): 2
Percent sedimentation: 9
35. Percent of bottom with rooted vegetation (ft.): 0
36. Average stream gradient (%): 1.9
Percent landform gradient RB: 17.2
LB: 17.6
37. Average stream velocity (f/s): 2.46
38. Stream discharge (c.f.s.): 41
39. Average water temperature: (F) or °C)
Max.: 61.7
Min.: 60.3
40. Turbidity description: Milky
41. Access: (mi.)
a. Remote
b. Low standard trails
c. Improved trails
d. Low standard roads
e. Improved roads: 4.5
42. Water quality analysis:
a. Hatch kit: X
b. Chemical
c. Coli: X

(over)

43. General Remarks

The major upstream impact on the creek is from Woodruff Dam and Reservoir. Water level fluctuations can be detrimental to fisheries because they can reduce the aquatic invertebrate populations which the fish feed on and because they decrease the bank stabilit causing increased turbidity. A large fluctuation was observed in August when the flow was suddenly reduced by about one-third the original amount. Fluctuations are necessary for good use of the reservoir as irrigation waters, but much more gradual changes would have less detrimental effects on the aquatic life of the stream.

The creek is heavily fished, especially on weekends. Flyfishing is possible, but difficult because of turbidity and dense willows along much of the creek.

There are several underdeveloped campsites along the creek below the dam; these are heavily used and always full on weekends. The channel at S-2 is artificial; banks are composed of steeply-piled 44. Narrative Report - Watershed Condition
boulders.

The BLM land on Woodruff Creek is part of the Eastern Allotment. This area is used in mid-summer by 300 cattle. See Appendix for further details.

There are two main reasons for the unstable banks. One is the fluctuations of the water level which periodically scour the raw banks and prevents or retards the development of protective vegetation. The other reason is cattle and fishermen walking on the raw banks, causing them to fracture and slough off. A secondary reason is cattle grazing, which also retards growth of protective vegetation.

The channel stability is rated "fair" according to the Forest Service Channel Stability Evaluation Form.

45. Management Recommendations

Woodruff Creek is an adequate fisheries, but improvements need to be made. Water level fluctuations should be made more gradually and unstable banks planted with willows.

Because BLM has such a small portion of the creek under its management, improvements will not have optimum effects. The possibility of trading with the State and private landowners for portions of the creek below the dam needs to be investigated.

Since the stream is of such value as a fisheries, cattle should be fenced out of the stream. Cattle could be watered from water tanks or a pipeline placed away from the creek.

With the stress placed on the stream by camping, possible development of campsites should be investigated. At present there are no drinking water facilities and more and better placed toilets are necessary to prevent possible pollution from sewage wastes.

Placing rock rip-rap along the bases of some raw banks will help reduce their erosion. All raw sections should be planted with low native grasses. No willows need be planted since there are already too many along the Creek.

To reduce the impact of fishermen walking on raw banks, notices could be posted describing the connection between eroding banks and reduced fishing quality and encouraging fishermen to avoid the raw sections.

TABLE I. SUMMARY OF PHYSICAL STREAM HABITAT CHARACTERISTICS

Station	% Optimum Habitat: Pool-Riffle Ratio	Pool Quality	Stream Bottom	Bank Cover	Bank Stability	Total Habitat	% Water Surface in Channel Area	% Spawning 1/ Gravels	2/ % Silt Sediments	Avg. Depth (Ft.)	Avg. Width (Ft.)	Channel Width (Ft.)	Velocity (fps)	Stream flow (c.f.s.)	% Stream Stream Gradient	Temp. (°F) Air	Temp. (°F) Water	Landfor gradient % LB	Landfor gradient % RB	Stream Shade %
BLM																				
2	60	100	98	38	63	72	72	25	0	0.8	25	176	2.46	47.91	2.8	74.3	61.7	29.8	29.0	15
AVG																				
State																				
1	90	86	100	38	78	78	76	28	20	0.5	22	144	--	35	1	67.1	61	4.5	5	35
AVG																				

1/ Includes only fine and coarse gravels (0.1 to 3.0 inches).

2/ Includes sand, muck, and silts averages for each individual station.

SPRING CREEK

August, 1975

Spring Creek is a short (three-quarters mile) medium-sized stream which flows into Little Creek. One half mile is on BLM land and the other quarter mile, including the headwater spring, is privately owned. The stream has fisheries potential and is especially aesthetically pleasing.

STREAM HABITAT SURVEY SUMMARY AND ANALYSIS

1. State -- County n Utah Rich	2. District Salt Lake	3. Resource Area -- P.U. Randolph
4. Drainage Little Creek	5. Stream Unit Spring Creek	6. Location T. 11 N. R. 6 E. Sect.
7. Investigators 7. Ryan (WICHE)		8. Date 8/1/75

General Data

9. Total length of stream (mi.) 1.0

10. Total length of stream:

	Surveyed (mi.)	Percent Ownership
a. BLM	.5	50
b. USFS		
c. Public, other	0	
d. Private	.5	35

11. Total No. sample stations:
    a. BLM 1
    b. Public 0
    c. Private 0

12. Total of all stream width measurements (ft.) 32

13. Total channel width (ft.) 32

14. Total width - all pools (ft.) 10

15. Total width of all pools classed 1, 2, and 3 (ft.) 0

16. Total footage of desirable bottom materials (ft.) 32

17. Total spawning gravels (ft.) 21

18. Sum of cover ratings 17

19. Sum of stability ratings 31

20. Elevation: (M.S.L.)
    a. Lowest 6560
    b. Highest 6720

21. Multiple use zones CATT/c

22 Number of camera points 3

23. Total cost
    a. Planning
    b. Salaries
    c. Equipment
    d. Analysis of data

Priority "A" Limiting Factors

24. Cost per station
25. Percent of total stream width in pools 31
26. Pool-riffle ratio, % optimum 62
27. Pool quality, & optimum 0
28. Percent of stream bottom with desirable materials 100
29. Bank cover, % optimum 43
30. Bank stability, % optimum 78
31. Percent of habitat optimum 57

Priority "B" Limiting Factors

32. Average depth of stream (ft.) 0.4
33. Average width of stream (ft.) 6
    Percent stream shaded 15
34. Percent of bottom with clinging vegetation (ft.) 3
    Percent sedimentation 34
35. Percent of bottom with rooted vegetation (ft.) 28
36. Average stream gradient (%) 1.3
    Percent landform gradient RB 15.2
    LB 15.6
37. Average stream velocity (f/s) 1.7
38. Stream discharge (c.f.s.) 2.9
39. Average water temperature: (^{o}F or ^{o}C)
    Max. 55.4
    Min. 45.5
40. Turbidity description CLEAR
41. Access: (mi.)
    a. Remote 0.25
    b. Low standard trails .75
    c. Improved trails
    d. Low standard roads
    e. Improved roads
42. Water quality analysis:
    a. Hatch kit X
    b. Chemical X
    c. Coli X

(over)

43. General Remarks

The stream flows through a narrow canyon with moderately sloping hillsides and enters Little Creek only a mile from its headwaters. An irrigation canal runs off the creek just before the confluence. Little Creek is also split into irrigation channels which finally flow into Little Creek Resevoir, which is annually stocked.

There is a low standard road to the headwater springs and no road along the stream. Access by foot to the stream mouth is an easy quarter mile walk from Pole Canyon Road.

The headwater springs are located on private land. About 200 feet down from the springs a fence crosses the stream. Above the fence is a large but completely bare lot due to cattle use. The spring is set in a deep (30 feet) narrow gulch with raw completely barren walls --also caused by extensive cattle overuse. Immediately below the fence is a dry meadow along the stream. It is in good condition and there are many live willows there. There is a charming log cabin along the creek.

44. Narrative Report - Watershed Condition

spring Creek is part of the New Canyon Allotment which includes 7 other streams with a total of 4841 AUM's. There is no record of a rest-rotation system being used on the creek. Cattle were observed in the canyon in spring and late summer but not inbetween when tall grasses were seen along the stream.

The streambed is in better condition than the other creeks in this allotment. There is some fracturing and raw sections of the banks but less than on the other creeks. The channel stability rating is "good" according to the Forest Service channel stability evaluation form.

The poor condition of the watershed adjacent to the headwater springs has been discussed in the General Remarks Section.

45. Management Recommendations

Spring Creek has the potential to be a fair quality fishery. Development as a fisery should be considered in conjunction with development of Little Creek.

Improvements need to be made. Bank stabilization could be best achieved be excluding the cattle from the canyon. Since the creek is so short the loss of grazing land would not be important. The canyon is fenced on 3 sides. One more fence is all that is needed. If complete exclusion of livestock is not possible then a rest-rotational graming system shoud be used. Planting willows will also help stabilize the banks and provide the stream cover which is now lacking. Placing rock rip-rap along the least stable banks might be necessary.

Along with the bank stabilization, improving the pool:riffle ratio is important. Log dams would be the most useful and least expensive means.

The creed deserves further study to determine its fishery potential. Additional stations should be set up since one is inadequate to represent the whole station.

43. General Remarks (cont.)

Dense mats of both rooted and clinging aquatic plants cover 20-40% of the stream bottom, and harbor numerous mayflies and caddisflies. The substrate consists primarily of fine and coarse gravels with little silt sediments.

The State and Hach Kit water analyses and the State bacteriological counts indicate that the water quality is adequate for a fishery.

TABLE 1. SUMMARY OF PHYSICAL STREAM HABITAT CHARACTERISTICS

Spring Creek
8/1/75

Station	% Optimum Habitat: Pool-Riffle Ratio	Pool Quality	Stream Bottom	Bank Cover	Bank Stability	Total Habitat	% Water Surface in Channel Area	% Spawning 1/ Gravels	2/ % Silt Sediments	Avg. Depth (Ft.)	Avg. Width (Ft.)	Channel Width (Ft.)	Velocity (fps)	Stream flow (c.f.s.)	% Stream Stream Gradient	Temp. (°F) Air	Temp. (°F) Water	Land-for gradient % LB	Land-for gradient % RB	Stream Shade %
BLM																				
1	62	0	100	43	78	57	100	66	34	0.4	6	6	1.7	2.9	1.3	69.8	55.4	15.6	18.2	15
AVG																				
AVG																				

1/ Includes only fine and coarse gravels (0.1 to 3.0 inches).

2/ Includes sand, muck, and silts averages for each individual station.

LITTLE CREEK

August, 1975

Little Creek is of moderate size (2.3 cfs) and length (3.5 miles). The stream flows for 1.25 miles on BLM land, 1 mile on private lands and 1.25 on State lands. It begins as a spring on State land and flows into Little Creek Reservoir after being joined by Old Canyon Creek and Spring Creek.

With improvements, it might become a fair quality fishery.

STREAM HABITAT SURVEY SUMMARY AND ANALYSIS

1. State -- County Utah Rich	2. District Salt Lake	3. Resource Area -- P.U. Randolph
4. Drainage Bear River	5. Stream Unit Little Creek	6. Location T. 11 N R. 6 E Sect.
7. Investigators 7. G. Ryan (WICHE)		8. Date 8/1/75

General Data

9. Total length of stream (mi.) 6.0

10. Total length of stream:

	Surveyed (mi.)	Percent Ownership
a. BLM	1.20	21
b. USFS		
c. Public, other	0	
d. Private	0	

11. Total No. sample stations:
a. BLM 1
b. Public 0
c. Private 0

12. Total of all stream width measurements (ft.) 36.

13. Total channel width (ft.) 40

14. Total width - all pools (ft.) 24

15. Total width of all pools classed 1, 2, and 3 (ft.) 0

16. Total footage of desirable bottom materials (ft.) 36.

17. Total spawning gravels (ft.) 8

18. Sum of cover ratings 16

19. Sum of stability ratings 24

20. Elevation: (M.S.L.)
a. Lowest
b. Highest 6744'

21. Multiple use zones Cattle
Irrigation

22. Number of camera points 4

23. Total cost
a. Planning
b. Salaries
c. Equipment
d. Analysis of data

Priority "A" Limiting Factors

24. Cost per station

25. Percent of total stream width in pools 6.7

26. Pool-riffle ratio, % optimum 66

27. Pool quality, & optimum 0

28. Percent of stream bottom with desirable materials 100

29. Bank cover, % optimum 40

30. Bank stability, % optimum 66

31. Percent of habitat optimum 53

Priority "B" Limiting Factors

32. Average depth of stream (ft.) 0.4

33. Average width of stream (ft.) 7
Percent stream shaded 10

34. Percent of bottom with clinging vegetation (ft.) 6
Percent sedimentation 72

35. Percent of bottom with rooted vegetation (ft.) 36

36. Average stream gradient (%) 1
Percent landform gradient RB 3.0
LB 5.4

37. Average stream velocity (f/s) 1.7

38. Stream discharge (c.f.s.) 2.34

39. Average water temperature: (°F or °C) Max. 62.6
Min. 51.8

40. Turbidity description Clear

41. Access: (mi.)
a. Remote
b. Low standard trails
c. Improved trails
d. Low standard roads 1.25
e. Improved roads 4.5

42. Water quality analysis:
a. Hatch kit X
b. Chemical
c. Coli X

(over)

43. General Remarks

Only one station was established; the study could be more accurate if another station had been placed.

Little Creek is located in Pole Canyon, a narrow V-shaped canyon with steep, sage-covered slopes. The headwater springs are on State land and a fence is placed 100 ft. below the springs to mark the BLM/State boundary. Similar to Spring Creek, a large barren area of dust adjacent to the springs has been created by the cattle. Cattle trample in the spring itself, muddying the water and cutting up the aquatic vegetation.

Much debris and sagebrush limbs clutter the creek and the bottom is almost completely covered with rooted aquatic vegetation. About 20% of the bottom consists of spawning gravels.

44. Narrative Report - Watershed Condition

Little Creek is a part of the New Canyon Allotment with 4841 AUMs. See Appendix for details.

The banks at S-1 are sometimes raw and fracturing because of cattle use.

The soil bank at the culvert where the Pole Canyon Road crosses the stream is eroding rapidly and beginning to undercut the road at the culvert.

Forest Service bank stability rating is "fair."

45. Management Recommendations

This creek has some fisheries potential and should be considered in conjunction with fisheries development on Spring Creek because the two creeks join where both are still in good condition before the water is split into irrigation canals or private farmland.

Improvements are necessary including:

1) improve pool; ripple ratio by building log dams.
2) stabilize banks by cattle restriction and willow plantings.
3) increase stream cover by willow planting.

If possible the headwater springs should be fenced off from the cattle. The State must be persuaded to do this or BLM could trade for the springs.

TABLE I. SUMMARY OF PHYSICAL STREAM HABITAT CHARACTERISTICS

Little Creek
8/1/75

Station	% Optimum Habitat						% Water Surface in Channel Area	% Spawning 1/ Gravels	2/ % Silt Sediments	Avg. Depth (Ft.)	Avg. Width (Ft.)	Channel Width (Ft.)	Velocity (fps)	Stream flow (c.f.s.)	% Stream Gradient	Temp. (°F)		Land-for gradient %		Stream Shade %
	Pool-Riffle Ratio	Pool Quality	Stream Bottom	Bank Cover	Bank Stability	Total Habitat										Air	Water	LB	RB	
BLM 1	66	0	100	40	60	53	90	22	75	0.4	7	8	1.7	2.34	1	64.4	62.6	3.0	5.4	15
AVG																				
AVG																				

1/ Includes only fine and coarse gravels (0.1 to 3.0 inches).

2/ Includes sand, muck, and silts averages for each individual station.

MIDDLE FORK OTTER CREEK

July, 1975

The Middle Fork of Otter Creek flows for three miles, of which one and three-quarter miles are on BLM lands. The rest is private land. The stream is presently a poor quality fisheries which can be greatly improved. However, the predominant use of the land is for grazing and cattle have unlimited access to the creek.

STREAM HABITAT SURVEY SUMMARY AND ANALYSIS

1. State -- County Utah Rich	2. District Salt Lake	3. Resource Area -- P.U. Randolph
4. Drainage Otter Creek	5. Stream Unit Middle Fork Otter Ck.	6. Location T. 11 N R. 6 E Sect.
7. Investigators 7. G. Ryan (WICHE)		8. Date July, 1975

General Data

9. Total length of stream (mi.) 3.0

10. Total length of stream:

	Surveyed (mi.)	Percent Ownership
a. BLM	1.75	58.
b. USFS		
c. Public, other	0	
d. Private	0.25	8.33

11. Total No. sample stations:
a. BLM 3
b. Public 0
c. Private 1

12. Total of all stream width asurements (ft.) 124

13. Total channel width (ft.) 189

14. Total width - all pools (ft.) 46

15. Total width of all pools classed 1, 2, and 3 (ft.) 0

16. Total footage of desirable bottom materials (ft.) 118

17. Total spawning gravels (ft.) 57

18. Sum of cover ratings 67

19. Sum of stability ratings 108

20. Elevation: (M.S.L.)
a. Lowest 6420
b. Highest 6760

21. Multiple use zones cattle
fishing

22 Number of camera points 7

23. Total cost
a. Planning
b. Salaries
c. Equipment
d. Analysis of data

Priority "A" Limiting Factors

24. Cost per station
25. Percent of total stream width in pools 37
26. Pool-riffle ratio, % optimum 74
27. Pool quality, & optimum 0
28. Percent of stream bottom with desirable materials 94
29. Bank cover, % optimum 41
30. Bank stability, % optimum 68
31. Percent of habitat optimum 44

Priority "B" Limiting Factors

32. Average depth of stream (ft.) 0.4
33. Average width of stream (ft.) 7
Percent stream shaded 13
34. Percent of bottom with clinging vegetation (ft.) 0
Percent sedimentation 41
35. Percent of bottom with rooted vegetation (ft.) 32
36. Average stream gradient (%) 1.6
Percent landform gradient RB 12.3
LB 10.0
37. Average stream velocity (f/s) 2.5
38. Stream discharge (c.f.s.) 2.5
39. Average water temperature: (°F or °C) Max. 61.7
Min. 46.4
40. Turbidity description clear-milky
41. Access: (mi.)
a. Remote
b. Low standard trails
c. Improved trails
d. Low standard roads 3.0
e. Improved roads
42. Water quality analysis:
a. Hatch kit x
b. Chemical x
c. Coli x

(over)

43. General Remarks

There are four springs within 1 mile of each other that feed into the Middle Fork. It is these springs which are the permanent headwaters of the stream. One spring is on BLM land and the other three are on private land. There is a small impoundment immediately below one of these headwater springs. (This is the only spring in the survey which fenced out the cattle.) The pond is muddy from cattle walking in it, shallow and choked with filamentous green algae. Up to 40 head of cattle were frequently observed around this pond.

Both the chemical analyses and the bacteriological counts are adequate for fisheries. The Middle Fork is usually stocked yearly. However, it was not stocked this year.

In the middle and lower reaches of the stream (S-1 and S-2), the water flows in a narrow deep streambed (less than 1 foot deep and 3-5 feet wide) with dense mats of rooted aquatic vegetation along one or both banks. Such mats provide protection for

44. Narrative Report - Watershed Condition

Middle Fork is included in the same cattle allotment as are the other two Otter Creek forks. (The New Canyon Allotment) See Appendix for allotments. The general watershed is in a relatively stable condition, but the streambed is suffering from the cattle-caused increased sedimentation, unstable banks and pollution from livestock wastes.

The upper banks of the stream are high (up to 6 feet) and usually steep. Some of these banks are raw and fracturing due to cattle trampling them. The rest of the banks are sparsely covered with grass and often fractured by cattle. The bank stability is listed as "fair" according to the USFS Bank Stability Evaluation Form.

45. Management Recommendations

The Middle Fork is presently a poor fisheries, but with improvements could become a fair quality one. The primary sources of problems are the cattle. They break down the banks, eat the vegetative cover and increase the turbidity.

The cattle must be controlled by: rest-rotation grazing and for fencing off the stream bottom and/or reduced allotments. The banks must be stabilized to reduce erosion by planting willows or other native plants (which will also increase the stream cover).

A major problem is the lack of high-class pools in the creek. Pools can be created by building log dams or rock structures at intervals throughout the stream. Such pool building is essential for a good fisheries.

The one BLM spring should be fenced off from the cattle.

A more extensive study is needed to determine the means necessary to improve the stream and control the cattle.

43. General Remarks (Continued)

smaller fish and habitats for invertebrates.

The lowest portions of the stream are in private farmland and the stream is split into several irrigation ditches.

TABLE I. SUMMARY OF PHYSICAL STREAM HABITAT CHARACTERISTICS

Middle Fork Otter Creek
T. 11 N, R. 6 E July, 1975

Station	% Optimum Habitat: Pool-Riffle Ratio	Pool Quality	Stream Bottom	Bank Cover	Bank Stability	Total Habitat	% Water Surface in Channel Area	% Spawning 1/ Gravels	2/ % Silt Sediments	Avg. Depth (Ft.)	Avg. Width (Ft.)	Channel Width (Ft.)	Velocity (fps)	Stream flow (c.f.s.)	% Stream Stream Gradient	Temp. (°F) Air	Temp. (°F) Water	Land-for gradient % LB	Land-for gradient % RB	Stream Shade %
BLM 1	68	0	82	53	38	46	59	33	51	0.5	8	60	2.5	4.6	3	86.9	61.7	6.0	4.2	20
2	96	0	100	53	78	65	59	52	45	0.5	7	56	3	-	1	73.4	54.5	5.2	5.2	10
3	28	0	100	33	65	45	68	64	25	0.2	6	41	2.2	1.7	1	77.9	51.8	9.8	29.4	10
AVG	64	0	94	46	60	52	62	50	40	0.4	7	11	2.6	3.2	1.7	79.4	56.0	7.0	12.9	13
Private 4	92	0	100	30	70	58	92	46	42	0.2	5	25	2.1	1.2	1.5	76.1	46.4	18.4	10.4	10
AVG																				

1/ Includes only fine and coarse gravels (0.1 to 3.0 inches).

2/ Includes sand, muck, and silts averages for each individual station.

SOUTH FORK OTTER CREEK

June, 1975

The South Fork of Otter Creek is a short section of a small stream which flows for two and a quarter miles from headwater springs to its confluence with the Middle Fork. One and a quarter miles of the stream are on private land, three-quarters of a mile on BLM land and a quarter mile on State land. The creek is not presently a fisheries and has the potential to be only a fair quality fisheries if improvements are made.

STREAM HABITAT SURVEY SUMMARY AND ANALYSIS

1. State -- County: Utah -- Rich
2. District: Salt Lake
3. Resource Area -- P.U.: Randolph
4. Drainage: Otter Creek
5. Stream Unit: South Fork Otter Creek
6. Location: T. 11 N. R. 6E, Sect.
7. Investigators: Ryan (WICHE)
8. Date: 6/27/75

General Data

9. Total length of stream (mi.): 2.25

10. Total length of stream:

	Surveyed (mi.)	Percent Ownership
a. BLM	1.5	67
b. USFS		
c. Public, other	0	
d. Private	0	

11. Total No. sample stations:
a. BLM: 2
b. Public: 4
c. Private: 0

12. Total of all stream width measurements (ft.): 55

13. Total channel width (ft.): 182

14. Total width - all pools (ft.): 19

15. Total width of all pools classed 1, 2, and 3 (ft.): 0

16. Total footage of desirable bottom materials (ft.): 53

17. Total spawning gravels (ft.): 31

18. Sum of cover ratings: 30

19. Sum of stability ratings: 53

20. Elevation: (M.S.L.)
a. Lowest: 6400
b. Highest: 6625

21. Multiple use zones: Ca #/2 people

22. Number of camera points: 3

23. Total cost
a. Planning
b. Salaries
c. Equipment
d. Analysis of data

Priority "A" Limiting Factors

24. Cost per station
25. Percent of total stream width in pools: 32
26. Pool-riffle ratio, % optimum: 57
27. Pool quality, & optimum: 0
28. Percent of stream bottom with desirable materials: 96
29. Bank cover, % optimum: 44
30. Bank stability, % optimum: 67
31. Percent of habitat optimum: 53

Priority "B" Limiting Factors

32. Average depth of stream (ft.): 0.4
33. Average width of stream (ft.): 6
Percent stream shaded: 5
34. Percent of bottom with clinging vegetation (ft.): 0
Percent sedimentation: 44
35. Percent of bottom with rooted vegetation (ft.): 66
36. Average stream gradient (%): 1
Percent landform gradient RB: 5.2
LB: 8.2
37. Average stream velocity (f/s): 2.4
38. Stream discharge (c.f.s.): 3.4
39. Average water temperature: 12
(°F or °C) Max.: 15
Min.: 8
40. Turbidity description: milky
41. Access: (mi.)
a. Remote
b. Low standard trails
c. Improved trails
d. Low standard roads: 2.25
e. Improved roads
42. Water quality analysis:
a. Hatch kit: x
b. Chemical: x
c. Coli: x

(over)

43. General Remarks

The South Fork is primarily used by cattle. There are no fish in it, but it could be a "fair" quality fishing stream if extensive improvements were made such as log dams to increase size and frequency of pools, banks were stabilized to reduce erosion and bank cover planted. Water chemical analysis and bacteriological counts are good enough for fish.

Much of the streambed has mats of aquatic plants along one or both edges of the stream. Both Middle Fork and the South Fork look similar, but the banks of the South Fork are in worse shape. Some water is removed for irrigation on the private land.

Observed two sandhill cranes in the tall grass on the private land. They remained for at least three weeks, possibly nesting. Sighted a great blue heron at same location.

44. Narrative Report - Watershed Condition

The creek is included in the New Canyon Allotment shich covers 7 of the creeks surveyed during this project. The allotment is 4841 AUMs. See the Appendix for complete details.

The banks are fractured and eroding due to cattle use along the whole stream and is especially bad at S-2. The stream bottoms are trampled by cattle and the water is turbid.

The soil around the culvert at S-1 is being eroded away and add to the silt content.

The bank stability is rated as "fair" according to the Forest Service Channel Stability Evaluation forms.

45. Management Recommendations

The South Fork could be made into a fair quality fisheries but with other streams in the Randolph area with better potentials for fisheries such as Randolph Creek, Birch Creek and the Middle Fork of Otter, the North Fork should have low priority.

The creek should be better managed to stabilize the banks and reduce the sedimentation. This can be accomplished by using a rest-rotational grazing system to permit the banks to stabilize. Raw banks should be planted by willows and the worst banks could use rock riprap.

The culvert at the road crossing should be replaced by a bridge and/or rock riprap placed over the raw banks at the crossing.

TABLE I. SUMMARY OF PHYSICAL STREAM HABITAT CHARACTERISTICS

South Fork Otter Creek
6/27/75

Station	% Optimum Habitat						% Water Surface in Channel Area	% Spawning 1/ Gravels	2/ % Silt Sediments	Avg. Depth (Ft.)	Avg. Width (Ft.)	Channel Width (ft.)	Velocity (fps)	Stream flow (c.f.s.)	% Stream Gradient	Temp. (°F)		Land-for gradient %		Stream Shade %
	Pool-Riffle Ratio	Pool Quality	Stream Bottom	Bank Cover	Bank Stability	Total Habitat										Air	Water	LB	RB	
BLM 1	61	0	98	25	70	51	59	36	53	0.5	7	18	2.7	3.4	1	17	15	2.5	3.6	1
2	52	0	100	63	63	56	16	74	26	0.2	4	24	2	-	1	13	8	13.9	26.8	10
AVG	57	0	96	44	67	54	38	55	40	0.4	6	21	2.4	3.4	1	15	12	8.2	15.2	5
AVG																				

1/ Includes only fine and coarse gravels (0.1 to 3.0 inches).

2/ Includes sand, muck, and silts averages for each individual station.

NORTH FORK OTTER CREEK

July 10, 1975

The North Fork of Otter Creek is a small stream which flows eight miles before entering irrigation canals in the Bear River Valley. Five miles of the stream are on BLM land. The primary use of the watershed is for cattle and sheep grazing with a secondary use being travel by logging trucks.

The stream has little potential as a fisheries.

STREAM HABITAT SURVEY SUMMARY AND ANALYSIS

1. State -- County: Utah -- Rich
2. District: Salt Lake
3. Resource Area -- P.U.: Randolph
4. Drainage: Otter Creek
5. Stream Unit: North Fork Otter Creek
6. Location: T. 10 N R. 5E,6E Sect.
7. Investigators: G. Ryan (WICHE)
8. Date: July 10, 1975

General Data

9. Total length of stream (mi.): 8 mi.

10. Total length of stream:

	Surveyed (mi.)	Percent Ownership
a. BLM	5	73
b. USFS	0	
c. Public, other	0	
d. Private	0	

11. Total No. sample stations:
a. BLM: 5
b. Public: 0
c. Private: 0

12. Total of all stream width measurements (ft.): 102

13. Total channel width (ft.): 197

14. Total width - all pools (ft.): 29

15. Total width of all pools classed 1, 2, and 3 (ft.): 0

16. Total footage of desirable bottom materials (ft.): 87

17. Total spawning gravels (ft.): 33

18. Sum of cover ratings: 106

19. Sum of stability ratings: 137

20. Elevation: (M.S.L.)
a. Lowest: 6340
b. Highest: 7160

21. Multiple use zones: Travel (Livestock, Cattle, people)

22. Number of camera points: 9

23. Total cost
a. Planning
b. Salaries
c. Equipment
d. Analysis of data

Priority "A" Limiting Factors

24. Cost per station
25. Percent of total stream width in pools: 28
26. Pool-riffle ratio, % optimum: 56
27. Pool quality, & optimum: 0
28. Percent of stream bottom with desirable materials: 85
29. Bank cover, % optimum: 53
30. Bank stability, % optimum: 63
31. Percent of habitat optimum: 51

Priority "B" Limiting Factors

32. Average depth of stream (ft.): 0.3
33. Average width of stream (ft.): 4.1
Percent stream shaded: 18
34. Percent of bottom with clinging vegetation (ft.): 0
Percent sedimentation: 34
35. Percent of bottom with rooted vegetation (ft.): 284
36. Average stream gradient (%): 3.6
Percent landform gradient RB: 18.2
LB: 11.5
37. Average stream velocity (f/s)
38. Stream discharge (c.f.s.): 2.1
39. Average water temperature: (°F or °C) 68.9
Max. 80.6
Min. 48.2
40. Turbidity description: clear/Muddy
41. Access: (mi.)
a. Remote: 0
b. Low standard trails: 0
c. Improved trails: 0
d. Low standard roads: 8
e. Improved roads: 0
42. Water quality analysis:
a. Hatch kit: X
b. Chemical: X
c. Coli: X

(over)

43. General Remarks

Only in the last few years has this creek been running permanently. Because it used to dry out by summer, a water pipeline was built along the canyon bottom for cattle use.

There is an old impoundment dam between S-4 and S-5. The stream has cut through the dam leaving no pool but only a wet grassy meadow behind the dam.

There are several deserted beaver dams between S-5 and the headwater springs.

The bottom reaches (below S-1) of the stream are used for farming by private owners and the stream is split into several irrigation channels. Along the larger channels are dense willows which probably survived because the owners do not graze their cattle in the farmland.

There are infrequent patches of willow and grassy meadow along the stream, but the grass is grazed to the ground and 30-50% of the willows are dead. Above S-3, a few

44. Narrative Report - Watershed Condition

The watershed is used primarily for livestock grazing. Otter Creek is part of the New Canyon Allotment which runs 1600 cattle from 5/15-8/31 and 1000 sheep during the spring and fall. A 40% reduction was instituted in the early 1960's, to the present total of 4841 AUMs. The watershed condition is generally stable. See Appendix for more details.

The cattle have contributed to most of the deterioration of the stream bottom. Upper banks are generally unstable with sparse vegetation and frequently raw sloughs (up to 5' high in some areas). Cattle are constantly walking on the banks causing further fracturing and walk on the stream bottom, cutting up the grasses and stirring up the bottom silts. The channel stability rating is fair to poor according to the USFS "Channel Stability Field Evaluation Form."

A secondary source of increased sedimentation comes from the dirt road built on the canyon bottom. It is occasionally right next to the stream, causing some cuts to wash into the creek. This road has been extensively used by logging trucks and the soft dust is up to 8 inches in some places.

Added pollution comes from livestock waste dropped directly into the stream.

45. Management Recommendations

This stream would probably not make an adequate fisheries. The primary reason is that there is no assurance that the creek will continue to run permanently. Other reasons include: insufficient discharge, lack of depth and lack of pools.

The allotment deserves better management to abate the sediment pollution that the creek contributes to the Bear River and to improve the range condition. All possible solutions are based on removing cattle or limiting their access to the stream by: 1) fencing the stream bed and using the existing pipeline to water the cattle; 2) encouraging cattle to use the higher grazing areas by providing water there; 3) reduce cattle allotments; 4) and/or utilize a rest-rotation grazing plan. The stream banks must be stabilized by some of the cattle-use controls listed above and by planting willows and other native plants on raw banks.

43. General Remarks (Continued)

aspen groves appear.

Sighted two mature golden eagles at S-3.

Both chemical and bacteriological analyses indicate that the water is adequate for fisheries, but low discharge and turbidity caused by cattle suggest that it should not be developed for that purpose. There is no fish stocking.

TABLE I. SUMMARY OF PHYSICAL STREAM HABITAT CHARACTERISTICS

North Fork Otter Creek
July 10, 1975

Station	% Optimum Habitat						% Water Surface in Channel Area	% Spawning 1/ Gravels	2/ % Silt Sediments	Avg. Depth (Ft.)	Avg. Width (Ft.)	Channel Width (Ft.)	Velocity (fps)	Stream flow (c.f.s.)	% Stream Stream Gradient	Temp. (°F)		Land-for grad-ient %		Stream Shade %
	Pool-Riffle Ratio	Pool Quality	Stream Bottom	Bank Cover	Bank Stability	Total Habitat										Air	Water	LB	RB	
BLM 1	92	0	82	50	58	56	52	26	44	0.4	8	15	1.1	3.4	1	86	81	4.2	2.0	10
2	58	0	86	65	50	52	35	21	43	0.2	3	8	1.7	1.3	6	81	81	7.8	10.3	30
3	46	0	92	43	73	50	41	31	35	0.2	3	6	1.5	1.3	1.5	75	64	8.8	17.4	10
4	0	0	67	55	75	39	67	33	33	0.2	2	4	1.8	1.2	1	73	70	20.4	57.2	30
5	34	0	88	53	58	47	75	54	13	0.2	4	6	2.5	2.9	5.4	79	72	10.0	20.1	18
AVG	46	0	83	53	63	49	54	33	34	0.2	4	8	1.7	2.0	3.0	79	72	10.0	20.1	18
AVG																				

1/ Includes only fine and coarse gravels (0.1 to 3.0 inches).

2/ Includes sand, muck, and silts averages for each individual station.

BIRCH CREEK

August, 1975

Birch Creek is a medium-sized stream which flows for seven and a half miles and has two reservoirs located on it, measuring an additional mile long. The creek flows on BLM land for three-quarters of a mile, on State land for one and a half miles and the rest is private land and joins Woodruff Creek. The reservoirs provide excellent fishing, but not much fishing of the creek itself is possible because it is lined with dense willows. The stream portion below the dams is used for livestock grazing.

STREAM HABITAT SURVEY SUMMARY AND ANALYSIS

1. State -- County: Utah Rich
2. District: Salt Lake
3. Resource Area -- P.U.: Randolph
4. Drainage: Woodruff Creek
5. Stream Unit: Birch Creek
6. Location: T. 9N R. 6 E Sect.
7. Investigators: G. Ryan (WICHE)
8. Date: 8/14, 8/21/75

General Data

9. Total length of stream (mi.): 30

10. Total length of stream:

	Surveyed (mi.)	Percent Ownership
a. BLM	.75	2.5
b. USFS		
c. Public, other	0	0
d. Private	0	0

11. Total No. sample stations:
a. BLM: 2
b. Public: 0
c. Private: 0

12. Total of all stream width measurements (ft.): 178

13. Total channel width (ft.): 201

14. Total width - all pools (ft.): 64

15. Total width of all pools classed 1, 2, and 3 (ft.): 21

16. Total footage of desirable bottom materials (ft.): 171

17. Total spawning gravels (ft.): 71

18. Sum of cover ratings: 46

19. Sum of stability ratings: 51

20. Elevation: (M.S.L.)
a. Lowest: 6580
b. Highest: 7320

21. Multiple use zones: fishing, camping, cattle

22. Number of camera points: 4

23. Total cost
a. Planning
b. Salaries
c. Equipment
d. Analysis of data

Priority "A" Limiting Factors

24. Cost per station
25. Percent of total stream width in pools: 36
26. Pool-riffle ratio, % optimum: 83
27. Pool quality, & optimum: 31
28. Percent of stream bottom with desirable materials: 96
29. Bank cover, % optimum: 58
30. Bank stability, % optimum: 64
31. Percent of habitat optimum: 68

Priority "B" Limiting Factors

32. Average depth of stream (ft.): 0.8
33. Average width of stream (ft.): 18.
Percent stream shaded: 40
34. Percent of bottom with clinging vegetation (ft.): 0
Percent sedimentation: 49
35. Percent of bottom with rooted vegetation (ft.): 17
36. Average stream gradient (%): 2.8
Percent landform gradient RB: 6.6
LB: 2.2
37. Average stream velocity (f/s): 2.35
38. Stream discharge (c.f.s.): 20.90
39. Average water temperature: (°F or °C) Max.: 57.2
Min.: 52
40. Turbidity description: milky muddy
41. Access: (mi.)
a. Remote
b. Low standard trails
c. Improved trails
d. Low standard roads
e. Improved roads: 0.8
42. Water quality analysis:
a. Hatch kit: X
b. Chemical
c. Coli: X

(over)

43. General Remarks

The reservoirs above the BLM lands control the water level fluctuations. Any large fluctuation over a short time period can be harmful to aquatic life. The sessi invertebrates are especially susceptible because their habitats are dried out by decreased flow and an increase in velocity and turbidity from increased flow can make their normal habitats uninhabitable. Fish can be affected by loss of invertebrate foods, increased turbidity and shallower water.

The creek from S-1 to its confluence with Woodruff Creek is broader and shallower with less dense bank cover than the region between S-2 and the dam where the water channel is deep, narrow and the bank covers make the stream inaccessible in most places.

Lush grasses were observed along the stream between S-2 and the dam, but the grasses at S-1 were cropped off at the soil.

44. Narrative Report - Watershed Condition

The BLM land along Birch Creek is in the Woodruff Pastures Allotment. A rest-rotation management system is being used and cattle use the Birch Creek section in the late summer. See Appendix for more details.

Raw fractured banks are common all along the stream. There are two major causes. One is cattle trampling the banks and the other is fluctuating water levels. Because of these two sources, vegetation cannot get a hold in the raw banks and help stabilize them. The dense willows already along the bank are important in retaining the present bank stability.

The USFS Bank Stability Evaluation rates Birch Creek as "fair-poor."

45. Management Recommendations

The creek is large enough and the quality good enough to make a good fishery, But the problems of bank instability and the resultant turbidity must be overcome first. Water level fluctuations must be kept to a minimum and on a graded plan so that changes occur over long time periods. Planting the upper banks and perhaps more restrictions of cattle will help also stabilize the banks.

Pool frequency and quality should be increased by building log dams or gabions.

The possibility of trading for more BLM control of the creek below the dams should be investigated.

Further studies are necessary to determine if bank stability is presently deteriorating or improving.

TABLE I. SUMMARY OF PHYSICAL STREAM HABITAT CHARACTERISTICS

Birch Creek
August, 1975

Station	% Optimum Habitat						% Water Surface in Channel Area	% Spawning 1/ Gravels	2/ % Silt Sediments	Avg. Depth (Ft.)	Avg. Width (Ft.)	Channel Width (Ft.)	Velocity (fps)	Stream flow (c.f.s.)	% Stream Gradient	Temp. (°F)		Land-for grad-ient %		Stream Shade %
	Pool-Riffle Ratio	Pool Quality	Stream Bottom	Bank Cover	Bank Stability	Total Habitat										Air	Water	LB	RB	
BLM 1	100	14	95	43	60	63	82	75	18	0.7	17	102	2.35	20.80	2	59.9	57.2	2.2	6.2	20
2	76	47	96	73	68	72	95	9	81	0.9	19	99	-	-	2.5	70.7	57.2	2.8	13.0	60
AVG	88	31	96	58	64	68	89	42	49	0.8	18	20	2.35	20.80	2.75	65.3	57.2	2.5	9.6	40
AVG																				

1/ Includes only fine and coarse gravels (0.1 to 3.0 inches).

2/ Includes sand, muck, and silts averages for each individual station.

WALTON CANYON CREEK

August 20, 1975

Walton Canyon Creek flows for seven miles from almost the Forest Service boundary, down Walton Canyon to join Birch Creek. Only one and a half miles of the creek are on two widely separated portions of BLM land and three-quarters mile is on State land. The remaining stream is on private land. Highway 39 runs the whole length of the creek. The creek would not make a good fisheries because the flow is too small (less than 1.5 cfs) and most of the stream is covered by impenetrable willow thickets.

STREAM HABITAT SURVEY SUMMARY AND ANALYSIS

1. State -- County Utah Rich	2. District Salt Lake	3. Resource Area -- P.U. Randolph
4. Drainage Birch Creek	5. Stream Unit Walton Canyon Creek	6. Location T. 9 N R. 5-6E Sect.
7. Investigators 7. G. Ryan (WICHE)		8. Date 8/20/75

General Data

9. Total length of stream (mi.) 7.0

10. Total length of stream:

	Surveyed (mi.)	Percent Ownership
a. BLM	1.5	21
b. USFS		
c. Public, other	0	
d. Private	0	

11. Total No. sample stations:
a. BLM 3
b. Public 0
c. Private 0

12. Total of all stream width measurements (ft.) 84

13. Total channel width (ft.) 135

14. Total width - all pools (ft.) 58

15. Total width of all pools classed 1, 2, and 3 (ft.) 33

16. Total footage of desirable bottom materials (ft.) 71

17. Total spawning gravels (ft.) 12

18. Sum of cover ratings 66

19. Sum of stability ratings 96

20. Elevation: (M.S.L.)
a. Lowest 6780
b. Highest 7580

21. Multiple use zones Travel / Cattle - Sheep

22. Number of camera points 4

23. Total cost
a. Planning
b. Salaries
c. Equipment
d. Analysis of data

Priority "A" Limiting Factors

24. Cost per station

25. Percent of total stream width in pools 69

26. Pool-riffle ratio, % optimum 62

27. Pool quality, & optimum 57

28. Percent of stream bottom with desirable materials 84

29. Bank cover, % optimum 55

30. Bank stability, % optimum 80

31. Percent of habitat optimum 68

Priority "B" Limiting Factors

32. Average depth of stream (ft.) 0.3

33. Average width of stream (ft.) 6
Percent stream shaded 15

34. Percent of bottom with clinging vegetation (ft.) 0
Percent sedimentation 49

35. Percent of bottom with rooted vegetation (ft.) 6

36. Average stream gradient (%) 1.7
Percent landform gradient RB 3.6
LB 3.2

37. Average stream velocity (f/s) 0.6

38. Stream discharge (c.f.s.) 1.2

39. Average water temperature: (°F or °C) Max. 53.9
Min. 53.2
0.3.6

40. Turbidity description clear

41. Access: (mi.)
a. Remote
b. Low standard trails
c. Improved trails
d. Low standard roads
e. Improved roads 7.0

42. Water quality analysis:
a. Hatch kit x
b. Chemical
c. Coli x

(over)

43. General Remarks

Highway 39 runs along the bottom of Walton Canyon and crosses the creek five times. There is no problem with erosion at the crossings because the banks near the culverts consist of boulders. The roadbed occasionally forms one side of the stream channel. These artificial stream banks are composed of boulders and some soil, but do not add significantly to the silt load. S-1 and S-2 are within a mile of each other. S-3 is 3½ miles upstream from S-2.

Generally, the creek is covered by dense willow thickets with frequent or continuous beaver dams and pools. There is presently some beaver activity. However, at S-1 and somewhat above the stream lies in a deep (3-6 foot), wide (up to 10 feet) channel with perpendicular raw soil banks.

Hach Kit Water Chemistry analysis and State bacteriological counts indicate fair quality water.

44. Narrative Report - Watershed Condition

The BLM land on the stream is part of the Middle Ridge Allotment which is used mainly by sheep with a total of 112 AUMs (See Appendix). There are records of use for the private land. No cattle and some sheep were observed grazing on private land. Livestock use is not causing significant deterioration of the stream.

The highway construction caused some fracturing of the banks mainly due to loss of vegetation. Much of stream has dense willow and lush grasses which create very stable conditions. The area of S-1 and a half mile upstream has quite unstable banks. The stations are all located at road crossings and are not fully representative of channel stability. The Forest Service rating of the station is "poor-fair" for channel stability; however, most of the stream had stable banks.

45. Management Recommendations

Development of a fishery is not recommended because of the low discharge, dense willow thickets and beaver dams which occasionally create fish barriers.

The unstable banks caused by highway construction appear to be stabilizing. But the unstable banks at and near S-1 need aid in order to decrease the amount of silt entering Birch Creek. Willow and other native species should be adequate.

TABLE I. SUMMARY OF PHYSICAL STREAM HABITAT CHARACTERISTICS

Walton Canyon Creek
8/20/75

Station	% Optimum Habitat: Pool-Riffle Ratio	Pool Quality	Stream Bottom	Bank Cover	Bank Stability	Total Habitat	% Water Surface in Channel Area	% Spawning 1/ Gravels	2/ % Silt Sediments	Avg. Depth (Ft.)	Avg. Width (Ft.)	Channel Width (Ft.)	Velocity (fps)	Stream flow (c.f.s.)	% Stream Gradient	Temp. (°F) Air	Temp. (°F) Water	Land-for gradient % LB	Land-for gradient % RB	Stream Shade %
BLM 1	78	0	74	35	60	49	45	39	26	0.2	5	10	0.6	1.2	1	58.6	50.0	10.2	7.4	5
2	52	12	96	70	88	64	66	35	48	0.2	5	7	-	-	1	57.2	57.2	26.0	20.8	5
3	32	97	84	60	93	73	78	5	74	0.4	8	10	-	-	3	59.0	54.5	45.4	33.8	35
AVG	54	55	85	55	80	62	63	26	49	0.3	6	9	0.6	1.2	1.7	56.6	53.9	27.2	20.6	15
AVG																				

1/ Includes only fine and coarse gravels (0.1 to 3.0 inches).

2/ Includes sand, muck, and silts averages for each individual station.

OLD CANYON CREEK

August, 1975

Old Canyon Creek begins at Willow Springs and flows 2.25 miles to join Little Creek. The stream flows over 1.75 miles of BLM land and 0.5 mile of private land.

The drainage is used primarily for cattle and would not provide an adequate fishery.

STREAM HABITAT SURVEY SUMMARY AND ANALYSIS

1. State -- County: Utah -- Rich
2. District: Salt Lake
3. Resource Area -- P.U.: Randolph
4. Drainage: Little Creek
5. Stream Unit: Old Canyon Creek
6. Location: T. 11 N. R. 6 E. Sect.
7. Investigators: Ryan (WICHE)
8. Date: August 2, 1975

General Data

9. Total length of stream (mi.) 2.25

10. Total length of stream:

	Surveyed (mi.)	Percent Ownership
a. BLM	1.75	78
b. USFS		
c. Public, other	0	
d. Private	0	

11. Total No. sample stations:
a. BLM 2
b. Public 0
c. Private 0

12. Total of all stream width measurements (ft.) 26

13. Total channel width (ft.) 29

14. Total width - all pools (ft.) 6

15. Total width of all pools classed 1, 2, and 3 (ft.) 0

16. Total footage of desirable bottom materials (ft.) 26

17. Total spawning gravels (ft.) 11

18. Sum of cover ratings 36

19. Sum of stability ratings 49

20. Elevation: (M.S.L.)
a. Lowest 6530
b. Highest 6800

21. Multiple use zones Cattle
Travel

22. Number of camera points 3

23. Total cost
a. Planning
b. Salaries
c. Equipment
d. Analysis of data

Priority "A" Limiting Factors

24. Cost per station
25. Percent of total stream width in pools 23
26. Pool-riffle ratio, % optimum 44
27. Pool quality, & optimum 0
28. Percent of stream bottom with desirable materials 100
29. Bank cover, % optimum 44
30. Bank stability, % optimum 62
31. Percent of habitat optimum 50

Priority "B" Limiting Factors

32. Average depth of stream (ft.) 0.2
33. Average width of stream (ft.) 2.5
Percent stream shaded 20
34. Percent of bottom with clinging vegetation (ft.) 0
Percent sedimentation 15
35. Percent of bottom with rooted vegetation (ft.) 0
36. Average stream gradient (%) 1
Percent landform gradient RB 4.6
LB 14.5
37. Average stream velocity (f/s) 1.9
38. Stream discharge (c.f.s.) 0.8
39. Average water temperature: (°F) or °C) Max. 68.0
Min. 71.6
Min. 66.2
40. Turbidity description muddy
41. Access: (mi.)
a. Remote
b. Low standard trails
c. Improved trails
d. Low standard roads
e. Improved roads 2.25
42. Water quality analysis:
a. Hatch kit x
b. Chemical
c. Coli x

(over)

43. General Remarks

Old Canyon Creek is small (< 1 cfs), shallow and runs in a channel of varying depth (2-6 feet high). There is no aquatic vegetation only 26 percent of the bottom has desirable materials. The banks are in bad condition and the water is milky from silt The creek would not be a good fishery.

The water chemical analysis shows fair quality water. The bacteriological count is high, but not unacceptable for class C waters.

Cattle have free access to Willow Springs and have muddied and cut up the stream badly.

44. Narrative Report - Watershed Condition

Old Canyon Creek is part of the New Canyon Allotment which covers seven other streams. Total AUMs are 4,841. See appendix for details.

The stream banks are unstable due to cattle overuse. Forest Service Channel Stability Rating is "fair-poor".

45. Management Recommendations

The creek cannot be developed into an adequate fishery. Cattle should be better managed to allow the banks to stabilize. A rest-rotation grazing system can best achieve this.

A fence should be built around Willow Springs to keep the cattle out. Part of the springs is on State land so cooperation with State agencies must be obtained.

Old Canyon Creek
T. 11 N., R. 6 E.
August 2, 1975

TABLE 1. SUMMARY OF PHYSICAL STREAM HABITAT CHARACTERISTICS

Station	% Optimum Habitat						% Water Surface in Channel Area	% Spawning 1/ Gravels	2/ % Silt Sediments	Avg. Depth (Ft.)	Avg. Width (Ft.)	Channel Width (Ft.)	Velocity (fps)	Stream flow (c.f.s.)	% Stream Stream Gradient	Temp. (°F)		Land-for grad-ient %		Stream Shade %
	Pool-Riffle Ratio	Pool Quality	Stream Bottom	Bank Cover	Bank Stability	Total Habitat										Air	Water	LB	RB	
BLM																				
1	16	0	120	50	53	44	86	67	17	0.2	2	3	2	0.8	1	71.6	69.8	3.0	18.4	20
2	72	0	100	38	70	56	93	21	14	0.2	3	3	1.8	0.8	1	68.0	66.2	6.2	10.6	20
AVG	44	0	100	44	62	50	89.5	44	15.5	0.2	2.5	3	1.9	0.8	1	69.8	68.0	4.6	14.5	20
AVG																				

1/ Includes only fine and coarse gravels (0.1 to 3.0 inches).

2/ Includes sand, muck, and silts averages for each individual station.

NEW CANYON CREEK

August, 1975

New Canyon Creek is 3 miles long with 1 mile flowing on BLM land, 0.25 mile on State land and 1.75 miles on private. The creek begins at Clawson Springs and ends in Little Creek Reservoir. It would not be an adequate fishery.

STREAM HABITAT SURVEY SUMMARY AND ANALYSIS

1. State -- County: Utah -- Rich
2. District: Salt Lake
3. Resource Area -- P.U.: Randolph
4. Drainage: Little Creek
5. Stream Unit: New Canyon Creek
6. Location: T. 11 N R. 6 E Sect.
7. Investigators: G. Ryan (WICHE)
8. Date: 8/2/75

General Data

9. Total length of stream (mi.): 3.0

10. Total length of stream:

	Surveyed (mi.)	Percent Ownership
a. BLM	1	33
b. USFS		
c. Public, other	0	
d. Private	0	

11. Total No. sample stations:
a. BLM: 1
b. Public: 0
c. Private: 0

12. Total of all stream width measurements (ft.): 11

13. Total channel width (ft.): 13

14. Total width - all pools (ft.): 3

15. Total width of all pools classed 1, 2, and 3 (ft.): 0

16. Total footage of desirable bottom materials (ft.): 9

17. Total spawning gravels (ft.): 4

18. Sum of cover ratings: 13

19. Sum of stability ratings: 22

20. Elevation: (M.S.L.)
a. Lowest: 6580
b. Highest: 6720

21. Multiple use zones: Cattle, travel, people

22. Number of camera points: 2

23. Total cost
a. Planning
b. Salaries
c. Equipment
d. Analysis of data

Priority "A" Limiting Factors

24. Cost per station
25. Percent of total stream width in pools: 27
26. Pool-riffle ratio, % optimum: 54
27. Pool quality, & optimum: 0
28. Percent of stream bottom with desirable materials: 82
29. Bank cover, % optimum: 33
30. Bank stability, % optimum: 55
31. Percent of habitat optimum: 42

Priority "B" Limiting Factors

32. Average depth of stream (ft.): .2
33. Average width of stream (ft.): 2.2
Percent stream shaded: 20
34. Percent of bottom with clinging vegetation (ft.): 16
Percent sedimentation: 9
35. Percent of bottom with rooted vegetation (ft.): 9
36. Average stream gradient (%): 1
Percent landform gradient RB: 5
LB: 5.6
37. Average stream velocity (f/s): 1.25
38. Stream discharge (c.f.s.): 0.94
39. Average water temperature: (°F or (°C))
Max.: 20
Min.: 25.5
40. Turbidity description: 11 CLEAR
41. Access: (mi.)
a. Remote
b. Low standard trails
c. Improved trails
d. Low standard roads: 3
e. Improved roads
42. Water quality analysis:
a. Hatch kit: X
b. Chemical: X
c. Coli: X

(over)

43. General Remarks

Clawson Springs is located in a meadow among an aspen grove. The rest of the strea- is in the sagebrush community, with occasional clumps of tall willow.

The creek discharge is only 1 cfs and the creek is shallow and slow. The bottom is about 25% silt sediments and 35% spawning gravels. There are few aquatic plants and the stream bank provides little cover.

Water chemical analyses and bacteriological counts indicate an acceptable water quality for class C waters.

44. Narrative Report - Watershed Condition

The creek is part of the New Canyon Allotment along with 7 other creeks. The licensed use is 4841 AUMs.

The banks are fairly unstable along the stream.

Frequently, the road runs next to the stream channel and cuts from the road cause increased turbidity.

F.S. channel stability rating is "poor."

45. Management Recommendations

The stream couldnot be developed into an adequate fisheries, but cattle use could be better controlled to allow the stream banks to recover.

Clawson S prings should be fenced to keep out the cattle. Again, these springs are on State land and State cooperation will be necessary.

TABLE 1. SUMMARY OF PHYSICAL STREAM HABITAT CHARACTERISTICS

New Canyon Creek
8/2/75

Station	% Optimum Habitat: Pool-Riffle Ratio	Pool Quality	Stream Bottom	Bank Cover	Bank Stability	Total Habitat	% Water Surface in Channel Area	% Spawning 1/ Gravels	2/ % Silt Sediments	Avg. Depth (Ft.)	Avg. Width (Ft.)	Channel Width (Ft.)	Velocity (fps)	Stream flow (c.f.s.)	% Stream Stream Gradient	Temp. (°F) Air	Temp. (°F) Water	Land-for gradient % LB	Land-for gradient % RB	Stream Shade %
1	54	0	82	33	55	42	85	36	9	0.2	2.2	2.6	1.25	0.94	1	26	20	5.6	5	20
AVG																				
AVG																				

1/ Includes only fine and coarse gravels (0.1 to 3.0 inches).

2/ Includes sand, muck, and silts averages for each individual station.

SAGE CREEK

July, 1975

Sage Creek flows for only four miles to join an irrigation canal in the Bear River Valley. Two miles of the stream are on BLM land and the rest is alternating State and private lands. The stream is small and polluted by livestock wastes and silt, and would not make a good fishery.

STREAM HABITAT SURVEY SUMMARY AND ANALYSIS

1. State -- County: Utah Rich
2. District: Salt Lake
3. Resource Area -- P.U.: Randolph
4. Drainage: Bear River
5. Stream Unit: Sage Creek
6. Location: T. 12 N R. 7 E Sect.
7. Investigators: G. Ryan (WICHE)
8. Date: 7/16, 7/30/75

General Data

9. Total length of stream (mi.): 40

10. Total length of stream:

	Surveyed (mi.)	Percent Ownership
a. BLM	2.0	50
b. USFS		
c. Public, other	0	
d. Private	0	

11. Total No. sample stations:
a. BLM: 2
b. Public: 0
c. Private: 0

12. Total of all stream width measurements (ft.): 42

13. Total channel width (ft.): 59

14. Total width - all pools (ft.): 19

15. Total width of all pools classed 1, 2, and 3 (ft.): 0

16. Total footage of desirable bottom materials (ft.): 92

17. Total spawning gravels (ft.): 5

18. Sum of cover ratings: 31

19. Sum of stability ratings: 54

20. Elevation: (M.S.L.)
a. Lowest: 6280
b. Highest: 6480

21. Multiple use zones: CATTLE
travel

22. Number of camera points: 2

23. Total cost
a. Planning
b. Salaries
c. Equipment
d. Analysis of data

Priority "A" Limiting Factors

24. Cost per station
25. Percent of total stream width in pools: 45
26. Pool-riffle ratio, % optimum: 90
27. Pool quality, & optimum: 0
28. Percent of stream bottom with desirable materials: 92
29. Bank cover, % optimum: 39
30. Bank stability, % optimum: 56
31. Percent of habitat optimum: 55

Priority "B" Limiting Factors

32. Average depth of stream (ft.): 0.2
33. Average width of stream (ft.): 4
Percent stream shaded: 5
34. Percent of bottom with clinging vegetation (ft.): 0
Percent sedimentation: 82
35. Percent of bottom with rooted vegetation (ft.): 52
36. Average stream gradient (%): 2.5
Percent landform gradient RB: 9.4
LB: 4.3
37. Average stream velocity (f/s): 0.7
38. Stream discharge (c.f.s.): 2.5
39. Average water temperature: 2.5
(°F or °C) Max. 77.9
Min. 68
40. Turbidity description: MILKY
41. Access: (mi.)
a. Remote
b. Low standard trails
c. Improved trails
d. Low standard roads: 2.5
e. Improved roads
42. Water quality analysis:
a. Hatch kit: X
b. Chemical: X
c. Coli: X

(over)

43. General Remarks

Sage Creek is a small stream (estimate 2 cfs) with warm, milky water. The stream gradient is 1° and the velocity is slow throughout elaborate meanders. About 40% of the stream bottom is covered with rooted aquatic vegetation. At S-1, the bottom is almost completely covered with silt but 1¼ mile upstream at S-2 about 30% of the bottom consists of coarse gravel to boulders.

The banks are generally unstable. At S-1 the water flows in a deep (6-10 feet) steep-sided wash with a broad grassy bottom (10-20 feet). The stream width averages 5 feet. The channel sides are mostly raw, exposed soil with sparse vegetation along some sections. Only during the spring runoff would the high water level reach these banks but cattle trample these banks into the stream, thereby increasing the silt load. At S-2 the banks are less tall (4-6 feet) and less steep than at S-1. There are frequent sections of raw bank.

44. Narrative Report - Watershed Condition

Sage Creek is part of the Sage Creek Allotment which licenses 1052 AUMs (See Appendix).

As mentioned above, both the upper and lower banks of the stream are badly trampled by cattle.

45. Management Recommendations

This stream is too small, sluggish and warm to be an adequate cold water fisheries.

Better land management is necessary to reduce the sedimentation by stabilizing the banks. This can be accomplished by a rest-rotational grazing system.

Plantings or rock rip-rap along raw banks will help increase bank stabilization.

43. General Remarks (Continued)

A small cool (7°C.) spring enters the stream at S-2. It is large enough to cool the creek water from 24.5° to 19° C.

TABLE I. SUMMARY OF PHYSICAL STREAM HABITAT CHARACTERISTICS

Sage Creek
T. 12 N, R. 7 E

Station	% Optimum Habitat						% Water Surface in Channel Area	% Spawning 1/ Gravels	2/ % Silt Sediments	Avg. Depth (Ft.)	Avg. Width (Ft.)	Channel Width (Ft.)	Velocity (fps)	Stream flow (c.f.s.)	% Stream Gradient	Temp. (°F)		Land-for grad-ient %		Stream Shade %
	Pool-Riffle Ratio	Pool Quality	Stream Bottom	Bank Cover	Bank Stability	Total Habitat											Air Water	LB	RB	
BLM 1	70	0	100	50	38	52	71	0	100	0.2	3	5	0.7	2	4	78.8	68.0	2.8	5.6	5
2	96	0	84	28	73	56	71	8	64	0.2	5	7	-	2	1	79.7	77.9	5.8	13.2	5
AVG	83	0	92	39	56	54	71	4	82	0.2	4	6	0.7	2	2.5	79.3	73.0	4.3	9.4	5
AVG																				

1/ Includes only fine and coarse gravels (0.1 to 3.0 inches).

2/ Includes sand, muck, and silts averages for each individual station.

NORTH FORK SAGE CREEK

August, 1975

The North Fork of Sage Creek flows along Highway 30 for two and a half miles with two road crossings. All but two miles are on BLM land, the other half mile is on State land. The creek has an estimated discharge of 1.5 cfs. Low flow and warm temperatures make for a poor fishery potential.

STREAM HABITAT SURVEY SUMMARY AND ANALYSIS

1. State -- County: Utah Rich
2. District: Salt Lake
3. Resource Area -- P.U.: Randolph
4. Drainage: Sage Creek
5. Stream Unit: North Fork Sage Creek
6. Location: T. 12 N R. 7 E Sect.
7. Investigators: G. Ryan (WICHE)
8. Date: 8/30/75

General Data

9. Total length of stream (mi.) 2.5

10. Total length of stream:

	Surveyed (mi.)	Percent Ownership
a. BLM	2.1	84
b. USFS		
c. Public, other	0	
d. Private	0	

11. Total No. sample stations:
a. BLM 1
b. Public 0
c. Private 0

12. Total of all stream width measurements (ft.) 14

13. Total channel width (ft.) 25

14. Total width - all pools (ft.) 2

15. Total width of all pools classed 1, 2, and 3 (ft.) 0

16. Total footage of desirable bottom materials (ft.) 14

17. Total spawning gravels (ft.) 7

18. Sum of cover ratings 13

19. Sum of stability ratings 39

20. Elevation: (M.S.L.)
a. Lowest 6400
b. Highest 6900

21. Multiple use zones travel, cattle, gravel pits

22 Number of camera points 1

23. Total cost
a. Planning
b. Salaries
c. Equipment
d. Analysis of data

Priority "A" Limiting Factors

24. Cost per station
25. Percent of total stream width in pools 14
26. Pool-riffle ratio, % optimum 28
27. Pool quality, & optimum 0
28. Percent of stream bottom with desirable materials 100
29. Bank cover, % optimum 33
30. Bank stability, % optimum 73
31. Percent of habitat optimum 47

Priority "B" Limiting Factors

32. Average depth of stream (ft.) 0.1
33. Average width of stream (ft.) 3
Percent stream shaded 5
34. Percent of bottom with clinging vegetation (ft.) 0
Percent sedimentation 57
35. Percent of bottom with rooted vegetation (ft.) 7
36. Average stream gradient (%) 1
Percent landform gradient RB 3.8
LB 19.2
37. Average stream velocity (f/s) 1.0
38. Stream discharge (c.f.s.) 1.0
39. Average water temperature: (°F or °C) Max. 66.2
Min. 66.2
40. Turbidity description milky
41. Access: (mi.)
a. Remote
b. Low standard trails
c. Improved trails
d. Low standard roads
e. Improved roads
42. Water quality analysis:
a. Hatch kit
b. Chemical
c. Coli

(over)

43. General Remarks

The North Fork is small and shallow. The channel is clogged with sagebrush debris and aquatic vegetation. The upper banks are moderately stable with some raw sections. The cattle have also trampled the lower banks which are grassy but fractured.

There is a dead cow 100 feet below T-5.

The Hach Kit Chemical analysis gives a D.O. value of 6.5 mg/l. This is low for productive aquatic life. Other chemical values are acceptable and the State bacteriological counts are low.

44. Narrative Report - Watershed Condition

The Creek is part of the Sage Creek Allotment with 1052 AUMs (See Appendix).

The cattle have created unstable conditions for the stream banks and caused an increase in turbidity.

45. Management Recommendations

The North Fork has little potential as a fisheries. Management plans should include measures to improve the stream by stabilizing the banks and reducing the turbidity. Better control of the cattle is necessary to accomplish these goals. A rest-rotation system and planting the raw banks with willows or native grasses would help stabilize the stream banks.

TABLE I. SUMMARY OF PHYSICAL STREAM HABITAT CHARACTERISTICS

North Fork Sage Creek
T. 12 N, R. 7 E

Station	% Optimum Habitat						% Water Surface in Channel Area	% Spawning 1/ Gravels	2/ % Silt Sediments	Avg. Depth (Ft.)	Avg. Width (Ft.)	Channel Width (Ft.)	Velocity (fps)	Stream flow (c.f.s.)	% Stream Stream Gradient	Temp. (°F)		Land-for gradient %		Stream Shade %
	Pool-Riffle Ratio	Pool Quality	Stream Bottom	Bank Cover	Bank Stability	Total Habitat										Air	Water	LB	RB	
BLM 1	28	0	100	33	73	47	56	7	57	0.1	3	5	-	1.5	1	70.7	66.2	19.2	3.8	5
AVG																				
AVG																				

1/ Includes only fine and coarse gravels (0.1 to 3.0 inches).

2/ Includes sand, muck, and silts averages for each individual station.

NORTH FORK OF SIXMILE CREEK
August, 1975

The North Fork flows across the Idaho border for an undetermined distance before joining Sixmile Creek. Only a quarter mile of the creek is on BLM land, the other two miles in Utah are on alternating private and state lands. Numerous smallfry were found in the stream but the creek would not make a good quality fisheries.

STREAM HABITAT SURVEY SUMMARY AND ANALYSIS

1. State -- County: Utah -- Rich
2. District: Salt Lake
3. Resource Area -- P.U.: Randolph
4. Drainage: Sixmile Creek
5. Stream Unit: North Fork Sixmile Creek
6. Location: T. 13 N. R. 7 E. Sect.
7. Investigators: Ryan (WICHE)
8. Date: 8/15/75

General Data

9. Total length of stream (mi.) undetermined

10. Total length of stream:

	Surveyed (mi.)	Percent Ownership
a. BLM	0.25	—
b. USFS	—	—
c. Public, other	0	—
d. Private	0	—

11. Total No. sample stations:
    a. BLM: 1
    b. Public: 0
    c. Private: 0

12. Total of all stream width measurements (ft.): 51
13. Total channel width (ft.): 59
14. Total width - all pools (ft.): 49
15. Total width of all pools classed 1, 2, and 3 (ft.): 0
16. Total footage of desirable bottom materials (ft.): 100
17. Total spawning gravels (ft.): 0
18. Sum of cover ratings: 10
19. Sum of stability ratings: 25
20. Elevation: (M.S.L.)
    a. Lowest: 6380
    b. Highest: 6520
21. Multiple use zones: Cattle
22. Number of camera points: 1
23. Total cost
    a. Planning: —
    b. Salaries: —
    c. Equipment: —
    d. Analysis of data: —

Priority "A" Limiting Factors

24. Cost per station: —
25. Percent of total stream width in pools: 96
26. Pool-riffle ratio, % optimum: 8
27. Pool quality, & optimum: 0
28. Percent of stream bottom with desirable materials: 100
29. Bank cover, % optimum: 25
30. Bank stability, % optimum: 63
31. Percent of habitat optimum: 39

Priority "B" Limiting Factors

32. Average depth of stream (ft.): 0.3
33. Average width of stream (ft.): 10
    Percent stream shaded: 10
34. Percent of bottom with clinging vegetation (ft.): 0
    Percent sedimentation: 100
35. Percent of bottom with rooted vegetation (ft.): 63
36. Average stream gradient (%): 1
    Percent landform gradient RB: 5.0
    LB: 3.4
37. Average stream velocity (f/s): —
38. Stream discharge (c.f.s.): 3
39. Average water temperature: 53.1
    (°F) or °C) Max. 65.
    Min. —
40. Turbidity description: clear
41. Access: (mi.)
    a. Remote: —
    b. Low standard trails: —
    c. Improved trails: —
    d. Low standard roads: 2.0
    e. Improved roads: —
42. Water quality analysis:
    a. Hatch kit: X
    b. Chemical: —
    c. Coli: X

(over)

41. General Remarks

The North Fork is larger than either the South Fork or the central fork of Sixmile Creek. The stream is wide (8-15 feet) and still relatively deep (0.3 feet) with rooted aquatic plants covering almost all of the bottom. The plant mats have collected la: amounts of silts and no uncovered spawning gravels were observed. This information leaves the origin of the numerous small fish fry in doubt.

Water quality according to HACH kit analysis and State bacteriologist testing shows fair quality.

42. Narrative Report - Watershed Condition

The North Fork is part of the Duck Creek Allotment which is in poor general condition and deteriorating.

The stream condition is better than the South Fork but there are many sections of the banks that are raw and erosion potential is moderate. The aquatic plants help greatly in trapping the suspended silts.

The channel stability is 'rated 'poor" according to the Forest Service channel stability evaluation form.

43. Management Recommendations

The creek large enough to be a fisheries, but seems to lack good rock, stream shade, spawning gravels, and stable banks. It should not be considered near the top of the priority list.

Better range management such as a rest rotation system would help improve both the general range and the creek.

TABLE I. SUMMARY OF PHYSICAL STREAM HABITAT CHARACTERISTICS

North Fork Sixmile Creek
T.13N., R.7E.
8/15/75

Station	% Optimum Habitat: Pool-Riffle Ratio	Pool Quality	Stream Bottom	Bank Cover	Bank Stability	Total Habitat	% Water Surface in Channel Area	% Spawning 1/ Gravels	2/ % Silt Sediments	Avg. Depth (Ft.)	Avg. Width (Ft.)	Channel Width (Ft.)	Velocity (fps)	Stream flow (c.f.s.)	% Stream Stream Gradient	Temp. (°F) Air	Temp. (°F) Water	Land-for grad-ient % LB	Land-for grad-ient % RB	Stream Shade %
BLM																				
1	8	0	100	25	63	39	86	0	100	0.3	10	12	-	3	1	68	58.1	3.4	5.0	10
AVG																				
AVG																				

1/ Includes only fine and coarse gravels (0.1 to 3.0 inches).

2/ Includes sand, muck, and silts averages for each individual station.

SOUTH FORK SIXMILE CREEK

July, 1975

The South Fork of Sixmile Creek flows for six and a half miles from the headwater springs until it joins Sixmile Creek. Three and a quarter miles are on BLM land. The drainage is used mainly for livestock and the general range condition is poor with a deteriorating trend. The stream itself is in poor condition. The potential for a fisheries is very low.

STREAM HABITAT SURVEY SUMMARY AND ANALYSIS

1. State -- County Utah Rich	2. District Salt Lake	3. Resource Area -- P.U. Randolph
4. Drainage Sixmile Creek	5. Stream Unit South Fork Sixmile Ck.	6. Location T. 13,12N R. 7 E Sect.
7. Investigators G. Ryan (WICHE)		8. Date 7/17, 8/3/75

General Data

9. Total length of stream (mi.) 6.5

10. Total length of stream:

	Surveyed (mi.)	Percent Ownership
a. BLM	3.25	50
b. USFS		
c. Public, other	0	
d. Private	0	

11. Total No. sample stations:
    a. BLM 3
    b. Public 0
    c. Private 0

12. Total of all stream width measurements (ft.) 32

13. Total channel width (ft.) 50

14. Total width - all pools (ft.) 5

15. Total width of all pools classed 1, 2, and 3 (ft.) 0

16. Total footage of desirable bottom materials (ft.) 30

17. Total spawning gravels (ft.) 11

18. Sum of cover ratings 35

Priority "A" Limiting Factors

24. Cost per station —
25. Percent of total stream width in pools 16
26. Pool-riffle ratio, % optimum 30
27. Pool quality, & optimum 0
28. Percent of stream bottom with desirable materials 92
29. Bank cover, % optimum 28
30. Bank stability, % optimum 63
31. Percent of habitat optimum 43

Priority "B" Limiting Factors

32. Average depth of stream (ft.) 0.1
33. Average width of stream (ft.) 2
    Percent stream shaded 10
34. Percent of bottom with clinging vegetation (ft.) 0
    Percent sedimentation 38
35. Percent of bottom with rooted vegetation (ft.) 16
36. Average stream gradient (%) 1.7
    Percent landform gradient RB 7.8
    LB 3.9
37. Average stream velocity (f/s) —

43. General Remarks

The creek at S-1 flows in a narrow (6 ft.), deep (3-5 feet) channel with exposed banks or sparsely vegetation.

There are several slowly seeping springs between S-1 and S-2. The flow at S-2 is smaller, but the bank conditions are about the same.

X-1 is a short tributary of the South Fork. It is shallow and has low banks, and is jammed with sagebrush limbs. There was evidence of flooding from runoff from summer storms along the creek.

The Hach Kit and U.S.G.S. Chemical analyses and State bacteriological tests showed that the water is of fair quality.

44. Narrative Report - Watershed Condition

The stream drainage is in the Duck Creek Allotment, a range in poor condition from overgrazing. The allotment was reduced by 50% to 2031 AUMs but this did not stop the trend toward deterioration.

The stream is also in poor condition. Many of the banks are exposed or sparsely vegetated causing the soil to erode into the stream. There are few tall plants to shade the stream.

45. Management Recommendations

The South Fork would not be a good fishery because it is too small and often dries up in drought years.

Better management is necessary to improve both the general range condition and the condition of the creek. A careful rest-rotation plan of management would be helpful and further allotment reductions might help.

TABLE I. SUMMARY OF PHYSICAL STREAM HABITAT CHARACTERISTICS

South Fork Sixmile Creek

Station	% Optimum Habitat						% Water Surface in Channel Area	% Spawning 1/ Gravels	2/ % Silt Sediments	Avg. Depth (Ft.)	Avg. Width (Ft.)	Channel Width (Ft.)	Velocity (fps)	Stream flow (c.f.s.)	% Stream Gradient	Temp. (°F)		Land-for gradient %		Stream Shade %
	Pool-Riffle Ratio	Pool Quality	Stream Bottom	Bank Cover	Bank Stability	Total Habitat										Air	Water	LB	RB	
BLM																				
1	40	0	100	38	65	49	68	20	47	0.2	3	4	-	1	1	82.4	71.6	0.8	1.2	15
2	0	0	100	25	68	39	64	67	44	0.1	2	3	-	1	3	-	70.7	7.6	16.4	10
X1	50	0	75	20	55	40	57	25	38	0.1	2	3	-	0.5	1	85.1	77.9	3.2	5.8	5
AVG	30	0	92	28	63	43	63	37	43	0.1	2	3	-	0.8	1.7	83.8	73.4	3.9	7.8	10
AVG																				

1/ Includes only fine and coarse gravels (0.1 to 3.0 inches).

2/ Includes sand, muck, and silts averages for each individual station.

HOME CREEK

August, 1975

Home Creek is a small stream seven and three-quarters miles long. Only one mile of this stream is on BLM land, another mile is State owned and the remainder is private land. An old irrigation channel (labeled Channel B) splits off of the main channel (labeled Channel A) near the upstream BLM boundary and the two channels flow parallel to each other for two miles before rejoining. The stream consists of two similar size streams while on BLM land. Each channel is discussed separately. This creek would not make an adequate fishery.

Access to the stream is blocked by private land ownership.

STREAM HABITAT SURVEY SUMMARY AND ANALYSIS

1. State -- County: Utah Rich
2. District: Salt Lake
3. Resource Area -- P.U.: Randolph
4. Drainage: Irrigation Ditch
5. Stream Unit: Home Ck (Channel A)
6. Location: T. R. Sect.
7. Investigators:
8. Date: 8/19/75

General Data

9. Total length of stream (mi.): 7.75

10. Total length of stream:

	Surveyed (mi.)	Percent Ownership
a. BLM	1	12.9
b. USFS		
c. Public, other	0	
d. Private	0	

11. Total No. sample stations:
a. BLM: 1
b. Public: 0
c. Private: 0

12. Total of all stream width measurements (ft.): 26

13. Total channel width (ft.): 48

14. Total width - all pools (ft.): 1

15. Total width of all pools classed 1, 2, and 3 (ft.): 0

16. Total footage of desirable bottom materials (ft.): 25

17. Total spawning gravels (ft.): 9

18. Sum of cover ratings: 21

19. Sum of stability ratings: 15

20. Elevation: (M.S.L.)
a. Lowest: 6440
b. Highest: 7840

21. Multiple use zones: cattle

22. Number of camera points: 1

23. Total cost
a. Planning
b. Salaries
c. Equipment
d. Analysis of data

Priority "A" Limiting Factors

24. Cost per station: —
25. Percent of total stream width in pools: 4
26. Pool-riffle ratio, % optimum: 8
27. Pool quality, & optimum: 0
28. Percent of stream bottom with desirable materials: 9
29. Bank cover, % optimum: 53
30. Bank stability, % optimum: 38
31. Percent of habitat optimum: 39

Priority "B" Limiting Factors

32. Average depth of stream (ft.): 0.5
33. Average width of stream (ft.): 5
Percent stream shaded: 15
34. Percent of bottom with clinging vegetation (ft.): 4
Percent sedimentation: 65
35. Percent of bottom with rooted vegetation (ft.): 4
36. Average stream gradient (%): 1
Percent landform gradient RB: 3
LB: 20
37. Average stream velocity (f/s): —
38. Stream discharge (c.f.s.): 1.5
39. Average water temperature: (°F or °C)
Max.: 60.8
Min.: 46.7
40. Turbidity description: 60.8 muddy
41. Access: (mi.)
a. Remote
b. Low standard trails
c. Improved trails
d. Low standard roads: 3
e. Improved roads: 3.5
42. Water quality analysis:
a. Hatch kit: X
b. Chemical
c. Coli: X

(over)

43. General Remarks

Channel A is the original channel and is a deep wash (up to 15 feet) with perpendicular walls of exposed soil. There are few places where cattle can reach the water. Channel B was probably dug to be used to water livestock.

The stream bottom is mostly silt with very few aquatic plants. At S-1, some grasses grow sparsely on the lower banks and an occasional popular is found. About ½ mile upstream, the channel bottom is covered with young willows too dense to walk through.

A Hach Kit Chemical Analysis shows that the water is of fair quality.

44. Narrative Report - Watershed Condition

Home Canyon is the boundary of two allotments, Huffaker Allotment and Meacham Canyon Allotment. The total AUMs for both is 6096. (See Appendix.)

The stream is in poor condition with a heavy silt load from raw banks. Cattle cause problems by breaking off sections of the upper banks and by grazing off the vegetation at the areas where they can reach the water.

45. Management Recommendations

The creek is to small and too heavily silted to be a fishery. Because the water is destined to only be used for irrigation, there is little motivation to improve the stream for its own sake.

It is unlikely that removal of the cattle or a rest-rotational system will aid stabilization of the stream banks,although these procedures could improve the condition of the range.

TABLE I. SUMMARY OF PHYSICAL STREAM HABITAT CHARACTERISTICS

Home Creek (Channel A)
8/19/75

Station	% Optimum Habitat						% Water Surface in Channel Area	% Spawning 1/ Gravels	2/ % Silt Sediments	Avg. Depth (Ft.)	Avg. Width (Ft.)	Channel Width (Ft.)	Velocity (fps)	Stream flow (c.f.s.)	% Stream Gradient	Temp. (°F)		Land-for gradient %		Stream Shade %
	Pool-Riffle Ratio	Pool Quality	Stream Bottom	Bank Cover	Bank Stability	Total Habitat										Air	Water	LB	RB	
BLM 1A	8	0	96	53	38	39	54	35	65	0.5	5	48	-	1.5	1	67.1	60.8	20	3	15
AVG																				
AVG																				

1/ Includes only fine and coarse gravels (0.1 to 3.0 inches).

2/ Includes sand, muck, and silts averages for each individual station.

STREAM HABITAT SURVEY SUMMARY AND ANALYSIS

1. State -- County: Utah -- Rich	2. District: Salt Lake	3. Resource Area -- P.U.: Randolph
4. Drainage: Home Creek (Ch. A)	5. Stream Unit: Home Creek (Channel B)	6. Location: T. R. Sect.
7. Investigators: G. Ryan (WICHE)		8. Date: 8/19/75

General Data

9. Total length of stream (mi.) 3.0

10. Total length of stream:

	Surveyed (mi.)	Percent Ownership
a. BLM	3.0	25
b. USFS		
c. Public, other	0	
d. Private	0	

11. Total No. sample stations:
a. BLM 2
b. Public 0
c. Private 0

12. Total of all stream width easurements (ft.) 32

13. Total channel width (ft.) 67

14. Total width - all pools (ft.) 5

15. Total width of all pools classed 1, 2, and 3 (ft.) 0

16. Total footage of desirable bottom materials (ft.) 28

17. Total spawning gravels (ft.) 13

18. Sum of cover ratings 73

19. Sum of stability ratings 55

20. Elevation: (M.S.L.)
a. Lowest 6560
b. Highest 6846

21. Multiple use zones CATTLE

22 Number of camera points 1

23. Total cost
a. Planning
b. Salaries
c. Equipment
d. Analysis of data

Priority "A" Limiting Factors

24. Cost per station
25. Percent of total stream width in pools 16
26. Pool-riffle ratio, % optimum 30
27. Pool quality, & optimum 0
28. Percent of stream bottom with desirable materials 38
29. Bank cover, % optimum 25
30. Bank stability, % optimum 54
31. Percent of habitat optimum 47

Priority "B" Limiting Factors

32. Average depth of stream (ft.) 0.3
33. Average width of stream (ft.) 6
Percent stream shaded 30
34. Percent of bottom with clinging vegetation (ft.) 0
Percent sedimentation 78
35. Percent of bottom with rooted vegetation (ft.) 0
36. Average stream gradient (%) 1
Percent landform gradient RB 10.6
LB 3.1
37. Average stream velocity (f/s) —
38. Stream discharge (c.f.s.) 1.5
39. Average water temperature: (°F) or °C) Max. 61.3
Min. 62.6
40. Turbidity description 60.8 MUDDY
41. Access: (mi.)
a. Remote
b. Low standard trails
c. Improved trails
d. Low standard roads 2
e. Improved roads 1
42. Water quality analysis:
a. Hatch kit
b. Chemical
c. Coli X

(over)

41. General Remarks

Channel B of Home Creek is a man-made irrigation ditch. It appears to be old because there are long patches of old dense populars and willow stands, along the stream. The banks vary from half a boot to 5 feet tall and are usually exposed or have sparce vegetation.

Cattle were observed in the stream along the whole channel.

Water quality is the same as for Channel A.

42. Narrative Report - Watershed Condition

The banks are badly fractured and the water has a heavy silt load.

The stream is between two allotments, Huffaker and Mecham Canyon Allotment, with 609 AUMs total.

43. Management Recommendations

A fishery is not recommended. The stream is too small and too heavily silted.

The stream banks could be improved by removing cattle from the canyon or using a rest-rotation management. Bank stabilization would be helped by planting native plants.

TABLE 1. SUMMARY OF PHYSICAL STREAM HABITAT CHARACTERISTICS

Home Creek (B channel)
(8/19/75)

Station	% Optimum Habitat						% Water Surface in Channel Area	% Spawning 1/ Gravels	2/ % Silt Sediments	Avg. Depth (Ft.)	Avg. Width (Ft.)	Channel Width (Ft.)	Velocity (fps)	Stream flow (c.f.s.)	% Stream Stream Gradient	Temp. (°F)		Land-for gradient %		Stream Shade %
	Pool-Riffle Ratio	Pool Quality	Stream Bottom	Bank Cover	Bank Stability	Total Habitat										Air	Water	LB	RB	
BLM 1B	0	0	76	80	75	46	65	0	88	0.3	2	2	-	1.5	1	67.1	60.8	4.9	4.0	40
2B	60	0	100	43	33	47	37	27	67	0.3	5	41	-	1.5	1	75.2	61.7	1.2	17.2	20
AVG	30	0	88	25	54	47	51	14	78	0.3	3.5	67	-	1.5	1	64.4	61.3	3.1	10.6	30
AVG																				

1/ Includes only fine and coarse gravels (0.1 to 3.0 inches).

2/ Includes sand, muck, and silts averages for each individual station.

NEPONSET RESERVOIR

General Remarks: A brief survey of Neponset Reservoir was conducted by raft by Don Duff, Ed Gomer and Gwen Ryan on July 21, 1975. Observations made included running transects to provide a rough estimate of the depth contours, notation of the types and location of vegetation and animal life and an analysis of water quality using a HACH Kit.

Neponset Reservoir is a large shallow reservoir whose primary purpose is to provide water storage for cattle and irrigation. The lake was formed by an earthern dam across Dry Creek. The surface of the lake is approximately one square mile with over half of the lake covering BLM land. The remainder covers private land owned by the Deseret Livestock Company. Because the land surrounding the reservoir is private, there is no public access available.

The reservoir is highly eutrophic. Dense submerged vegetation covers nearly the entire bottom of the lake, growing to within one to three feet of the surface. Such plantlife can be the location of highly productive aquatic invertebrate communities providing food for waterfowl and fish alike. The plants can also offer shelter for fish, although no fish were observed in the resevoir.

Maximum depth and even average depth could not be determined with the depth meter used because of the interference of the vegetation with the sonar. At one spot with no vegetation, seventeen feet was measured with a plumb line.

Distribution of both emergent aquatic plants and terrestrial shrubs is sparse and found mostly on the shores of the islands and not along the main shore. Cattle grazing along the shore eat or trample down most new shoots. The rush Juncus balticus is the dominant emergent plant.

Animal life is abundant. The reservoir is a resting place for migrating waterfowl. On the day of the survey, several hundred ducks were sighted plus 7 Canada geese and 6 American bitterns counted. Muskrat are present and numerous white-tailed prairie dog burrows were noted.

Unfortunately, there were not enough funds to perform a USGS water chemistry analysis. Field tests were run with the HACH Kit. The water temperature was warm with no layering (at the surface it was 60°F and 58°F at the 17-foot bottom). Dissolved oxygen was surprizingly low; 7 mg/l at the surface and 6 mg/l on the bottom. With the dense vegetation one might expect a higher concentration of DO. Another surprise was the high pH. It was greater than 10.0 (the highest reading on the HACH Kit).

Recommendations: In summary, Neponset Reservoir is a very productive body of water and is expecially valuble as a waterfowl refuge. Development of the reservoir for public use should be discouraged. The reservoir is too young and has not yet reached a stable ecological balance. Extensive pressure by man could upset the present equilibrium.

It is essential to fence out the cattle to permit growth of shore plants and stabilization of the banks. Planting willow shoots would help speed the process.

The combination of low DO, high pH and higher temperatures are not encouraging to fish. A more extensive chemical analysis should be made to check the accuracy of the field tests and to aid final decisions of the fisheries potential.

LIVESTOCK ALLOTMENTS

The principle use of lands in Rich County is for livestock production, mainly cattle. Some 150 operators rely on national resource lands for some portion of the needed livestock forage. The season of use for cattle is generally mid-May through mid-September. Sheep use is usually early spring and summer and late fall. The livestock make heavy use of the drainage bottoms and are highly dependent on various streams for drinking water.

The following allotments include the surveyed streams. Refer to Table I for more information.

Big Creek Allotment: (Includes Big Creek and Randolph Creek) The allotment presently licenses 4,046 AUMs, following a 40 percent reduction in the early 1960s. The only management tool is a north-south deferrment fence. Data from studies are poor, but all visual signs point to deteriorating condition, indicating reduction was not the answer.

New Canyon Allotment: (ncludes Old Canyon, New Canyon, Spring Creek, Little Creek and the three forks of Otter Creek) The present 4,841 AUMs follow a 40 percent reduction. There is deferred grazing as in Big Creek Allotment. The range condition appears to be somewhat more stable than Big Creek. Both Big Creek and New Canyon Allotments contain some productive fisheries and range management efforts should be directed more towards stream improvement.

Duck Creek Allotment: (Includes Six-mile Creek) The present 2,031 AUMs allotment follows a 50 percent reduction, which did not halt range deterioration. The condition is poor and the trend is downwards.

Sage Creek Allotment: (Includes Sage Creek) A reduction of allotments of 50 percent resulted in the present figure of 1,052 AUMs.

Woodruff Pastures Allotment: (Includes a small portion of Birch Creek) This allotment is under a rest-rotation grazing system. There has been no reduction in licensed use.

Middle Ridge Allotment: (Includes Walton Canyon) Because of the small amount of NRL, there is very little knowledge of this allotment. Licensed use totals 112 AUMs.

Meachum Canyon and Huffaker Allotments: Home Canyon is the boundary between these two allotments. Sheep use is dominant and Meachum has 284 AUMs and Huffaker has 325 AUMs.

Eastern Allotment: Borders Woodruff Reservoir and includes S-2. The area is used during mid-summer by 300 cattle.

TABLE I: LIVESTOCK ALLOTMENTS

Allotment Name	Number of Operators	Type of Livestock	Number of Livestock	AUMS	Season of Use	Acreage State	Federal	Private	Total
Big Creek	15	C S	1,300 1,500	4,046	5/10-9/15 Spr.&Fall	2,880	21,300	7,360	31,540
New Canyon	16	C S	1,600 1,000	4,841	5/15-8/31 Spr.&Fall	----	----	----	----
Duck Creek	---	C S	656 842	2,031	5/10-8/31 Spr.&Fall	560	15,762	9,167	25,489
Sage Creek	7	C S	316 900	1,052	5/10-8/31 Spr.&Fall	----	10,295	2,480	12,775
Woodruff Pastures	24	C S	1,000 2,400		5/15-9/15 Spr.&Fall	1,280	20,856	1,306	23,440
Middle Ridge	----	Mostly S	----	112	Summer	----	----	----	----
Meacham Canyon	----	Mostly S	----	284	----	----	----	----	----
Huffaker	----	Mostly S	----	325	----	----	----	----	----
Eastman	----	C S	300	----	Summer	----	40%	----	----

S: Sheep
C: Cattle

BACTERIOLOGICAL DATA

Table II

CREEK	DATE	TOTAL COLIFORMS/100ml	FECAL COLIFORMS/100ml
Randolph Creek	6/19	930	120
BLM land S-1	8/13	4300	14
BLM land S-2	6/19	230	4
USFS Land	6/19	150	9
Middle Fork Otter Creek	6/19	930	120
	8/13	4300	14
North Fork Otter Creek	6/19	2300	930
	8/13	2300	43
South Fork Otter Creek	6/19	210	210
	8/13	2300	430
Woodruff Creek State land	6/19	430	39
Woodruff Creek BLM land	6/19	23	--
Birch Creek	6/19	930	23
Old Canyon Creek	8/13	4300	750
New Canyon Creek	8/13	2300	430
LIttle Creek	8/13	2300	930
Spring Creek	8/13	390	230
North Fork Sixmile Crk.	8/13	2300	2300
South Fork Sixmile Crk.	6/19	430	430
	8/13	4300	2300
Sage Creek	6/19	230	93
	8/13	2300	930

CHEMISTRY DISCUSSION

The general recommendation for a fishery is a pH of 6.5-9.0. The pH measured in this survey averaged 9.0 and ranged from 8.0-9.5. A discrepancy was noticed when results from an independent laboratory found identical stream locations average pH's to be 7.5. The WICHE survey used a Hach Kit to test the pH and the independent laboratory used a pH meter which is a more reliable procedure. The pH given on the field Water Analysis forms should be accepted with caution. If the pH is 9.0, this is borderline and any increase would be detrimental to aquatic life. Further testing with more accurate procedures should be done.

RECOMMENDATIONS: Based on the results of the extensive stream habitat surveys conducted during the summer of 1975 and discussed herein it is recommended that:

1. Habitat Management Plans and Allotment Management Plans should be developed and implemented as soon as possible with habitat improvement projects including fencing, on a priority basis, as per the recommendations made on each streams habitat survey summary and analysis form to arrest the decline of aquatic habitat in all the streams inventoried.
   a. Four streams contain habitats that maintain an existing fisheries, but could be improved, namely Randolph, Woodruff, Middle Fork, Otter and Birch Creeks.
   b. Four streams have habitats which could have an existing fisheries, and certainly do have potential for improvement for fisheries development, namely, Spring, Little, South Fork Otter, and North Fork Sixmile Creeks.
   c. Eight streams contain habitats which at present are limited and have little or no potential for fisheries development, namely, North Fork Otter, Walton, Old Canyon, New Canyon, Sage, North Fork Sage, South Fork Sixmile, and Home Creeks.
2. All aquatic habitats inventoried, whether containing a fisheries at present or not, should be considered for immediate management and protection to assure deterioration and decline in watershed and water quality values.

3. Implement adequate grazing systems along these streams' riparian zones to assure adequate aquatic resource protection under multiple use management. The general condition of the streams are poor to fair. Many of the banks are quite unstable causing an unusually heavy siltload in the streams. This is the result of cattle in the streambed, trampling the banks, and grazing off the vegetation. Better management of the cattle is essential to stop the present trend of deterioration of aquatic habitat and water quality of the creeks. The best method would seem to be use of a rest-rotation or other grazing management system. Intensive use of stream-bottoms by livestock is creating instream and downstream water quality deterioration problems and is considered a source of pollution under P.L. 92-500.

4. BLM resource manager should consider and use the data presented in this report to arrive at adequate resource management decisions for the area. The BLM has been committed to a multiple-use program in land use. Until now, the dominant use of the region surveyed has been livestock grazing. With the current energy shortage, the Randolph region saw in 1975 an intensive search for oil and gas resources. The results of this search are not fully known but reports show a probability of oil fields and investigatory drilling is planned in the near future. With such a great economic boom in the region, it is feared that other uses of the land, especially fisheries, will not be given adequate consideration in the future land management planning.

5. Aquatic habitat management, including water quality protection, must be given high priority for management in this area because of the high and increasing recreation use of the fish and wildlife resources present.

The Federal Water Pollution Control Act of 1972 and the National Environmental policy Act stress the importance of assessing the environment to assure protection, management, and enhancement of all resources in multiple-use situations.

6. Continue intensive aquatic habitat and fisheries studies on Big Creek to assess habitat changes resulting from livestock uses. Big Creek was not inventoried under this report as BLM is conducting annual habitat studies on this stream.

7. Continue to defer public recreational use on Neponset Reservoir and maintain reservoir habitat for waterfowl and marsh fauna.

8. Consider the acquisition and use of color infrared aerial photography to assess aquatic and terrestrial vegetative types and their impacts from land uses, especially livestock grazing.

9. Re-survey all waters inventoried this summer after a five year period (1980) to assess changes in aquatic land environments from current and future uses as well as to monitor the success of aquatic improvements undertaken as a result of this report.

This intern report was read and accepted by a staff member at:

Agency: BUREAU OF LAND MANAGEMENT

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This report was completed by a WICHE intern. This intern's project was part of the Resources Development Internship Program administered by the Western Interstate Commission for Higher Education (WICHE).

The purpose of the internship program is to bring organizations involved in community and economic development, environmental problems and the humanities together with institutions of higher education and their students in the West for the benefit of all.

For these organizations, the intern program provides the problem-solving talents of student manpower while making the resources of universities and colleges more available. For institutions of higher education, the program provides relevant field education for their students while building their capacity for problem-solving.

WICHE is an organization in the West uniquely suited for sponsoring such a program. It is an interstate agency formed by the thirteen western states for the specific purpose of relating the resources of higher education to the needs of western citizens. WICHE has been concerned with a broad range of community needs in the West for some time, insofar as they bear directly on the well-being of western peoples and the future of higher education in the West. WICHE feels that the internship program is one method for meeting its obligations within the thirteen western states.

In its efforts to achieve these objectives, WICHE appreciates having received the generous support and assistance of the Economic Development Administration; the Jessie Smith Noyes Foundation; the National Endowment for the Humanities; the Wyoming Office of Manpower Planning; and of innumerable local leaders and community organizations, including the agency that sponsored this intern project.

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